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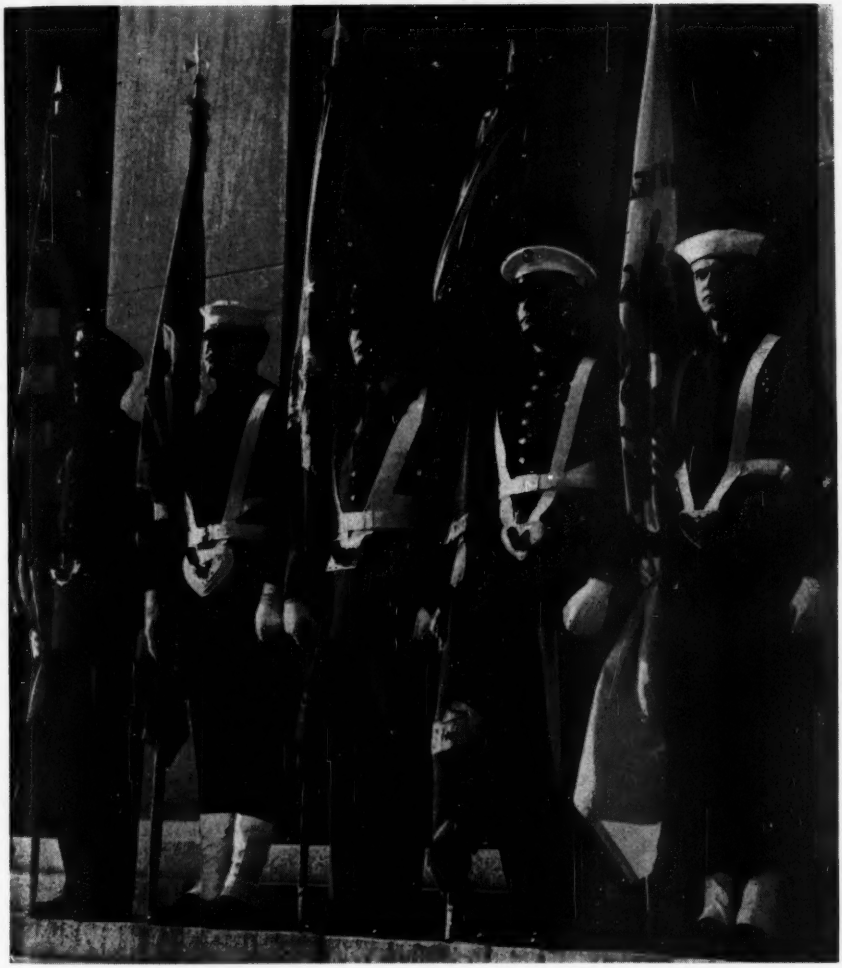

"POWER FOR PEACE"—ARMED FORCES DAY—15 MAY 1954

The slogan, "Power for Peace," will keynote the fifth anniversary celebration of Armed Forces Day to be held this year on 15 May wherever United States troops are serving. The observance will emphasize the basic concept that our national security and freedom depend upon the power which comes from American teamwork and national unity.

THE UNITED STATES ARMY EDUCATIONAL SYSTEM

Colonel George C. Reinhardt, *Corps of Engineers*
The Engineer Center, Fort Belvoir, Virginia

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

RESEARCHING national policies for educating career Army officers often uncovers bits of surprising humor. Much of this stems from the conviction prevalent for centuries that too much erudition harms the soldier. The old military maestro, Von Clausewitz, insisted that commanders be ignorant lest they quail at making the abrupt life and death decisions which are their inevitable responsibilities. For staff officers, Clausewitz admitted, schooling has some value. Ignorance of arithmetic might cause disastrous errors.

In lighter vein is the *École Superieure de Guerre's* tale of a Guards colonel who fought his regiment heroically after receiving a bullet in his head. The Emperor noticed this extraordinary achievement and directed a commission as General be given him in the hospital in the hope of encouraging his recovery. At the operating tent, the surgeon had just cut off the top of the Colonel's skull to extract the bullet, when the Emperor's Aide rushed in with the glad tidings.

"Congratulations, mon General. The Emperor desires you to wait upon him as soon as your strength permits." Immediately the new General rose from the operating table. Seizing the top of his skull in one hand and his hat with the other, he fitted them both crudely into position. "Wait, my General," the surgeon screamed in embarrassment, "I have not put back your brains."

"No matter," cried the officer from the door of the tent, "I no longer need them. I am a General."

As far as is known, the United States Army has never subscribed to either the Clausewitzian or the *École* tenets. Our trend has been toward a common sense viewpoint expressed by Elihu Root:

While practical qualities are more important in a soldier than knowledge of theory, this truth must not be made an excuse for indolence which destroys practical efficiency. The soldier whose mind is kept alert by intellectual exercises will be the stronger practical man.

But Elihu Root's influence dates with the twentieth century. Prior to the Civil War, an officer had no opportunity for professional improvement except private study—graduate schools did not exist. Every attempt to initiate one had proved abortive.

Typical among these disappointments was that of Colonel Henry Leavenworth, ordered in 1826 to command the 3d Infantry at Jefferson Barracks, Missouri, and authorized to establish a *School of Prac-*

tice for Infantry—which at that time meant the bulk of the Army. Personal records establish this project as the Colonel's lifelong ambition although history accords him fame entirely for his wilderness campaigns.

Education Delayed 50 Years

Traveling to Jefferson Barracks by the crude stages and river boats of the period, the enthusiastic Colonel abandoned most of his own baggage to carry texts for his beloved school. Courses of instruction had been outlined and a stable hastily converted into a classroom when War Department orders directed the Colonel to proceed with his regiment up the Missouri River and "establish a fort for the protection of caravans traversing the Santa Fe Trail."

Thus occurred one of the ironies of history. In May 1827, Colonel Leavenworth founded the post which still bears his name—the home of the Command and General Staff College. Yet this achievement delayed, for half a century, the realization of Henry Leavenworth's enlightened ideas of graduate instruction for Army officers.

The generations of American officers who rose to high command prior to the Spanish American War consequently had no formal schooling after they entered the Army although, like military men throughout the ages, they were perforce teachers and trainers most of their career. Enlisted men were trained entirely by, and within, their own unit. Little in the way of supervision or guidance emanated from the War Department.

The memoirs of Lieutenant Philip St. George Cooke, Military Academy graduate in 1826, Union cavalry general in the Civil War defeated by his son-in-law, J. E. B. Stuart, relate the difficulties engendered by this system. Selected in 1833 as one of the officers to organize the First Dragoons, when the mounted arm was restored to the Army, Cooke records the peculiar origin of his transformation from doughboy to cavalryman. During a campaign against the Indians, he spilled hot coffee into his boot. Unable to march on the blistered foot, Cooke was permitted to enter combat on a horse, an experience which convinced him he had fortuitously discovered a superior mode of fighting.

However, to get back to the matter of training, Cooke, now a full-fledged cavalryman, records his disgust at War Department orders scattering the three Dragoon squadrons to as many remote posts soon after their organization. "Thus," wrote Cooke, "the development of cavalry tactics and organization, which has been completely ignored in the United States Army for two decades, will be diversely revived by three separate and unrelated agencies."

It seems inconceivable to us—familiar with Department of the Army attention to doctrine development and supervision of training—that such things could be. But they were. A command was, largely in its organization and entirely in its training, a reflection of its own commander. George B. McClellan's claim to greatness—in addition to the McClellan saddle—was the soundness with which he organized and trained the Army of the Potomac so that it remained, after his relief, a fit tool for the tactical skill of Ulysses Grant. Every other army was organized

Throughout the years, the United States Army Educational System has contributed immensely to the national security and preparedness of our country and continues to play a vital role in our military history

and trained largely according to the dictates of the general commanding.

Worse yet, in the long years when there were no armies—when the military forces of the United States were divided into battalions and squadrons; when the various components of a regiment would not see each other for years—this diversity of training could be, to say the least, confusing.

Such decentralization was a relic of pre-Napoleonic days in Europe. Practically every nation had its remote skirmishes and colonial wars perennially engaging at least a portion of its career soldiers. Officers and men alike learned their profession in this ancient equivalent of "on-the-job training." Presumably the unskilled became casualties, while those who lived, learned.

The establishment of the United States Military Academy at West Point in 1802 was a remarkable recognition, by a nation as young as ours, that formal schooling for the young officer was preferable to appointing him to a border command, at the average age of 14, to "learn by doing," a system that espoused the "applicatory system" with a vengeance!

Even the establishment of the first graduate school for officers in the United States Army, the *School of Application for Cavalry and Infantry* at Fort Leavenworth in 1881, owes something to the personal touch. General William Tecumseh Sherman was then Commanding General of the United States Army. As a civilian lawyer, he had formed a great attachment for the town of Leavenworth—where he practiced—and for its neighboring military post.

After the Civil War, Fort Leavenworth's reason for existing had ceased. The frontiers had moved westward. Ordered abandoned by General Winfield Scott in 1861, Fort Leavenworth had been saved by its political friends in Kansas—one instance wherein the military profited by "civilian interference." Twenty years later, it again languished with a skeleton garrison.

One can only surmise that when two recommendations; first, establish a graduate school for officers and, second, close the now useless post of Fort Leavenworth, lay on the desk of the commander in chief, he saw in the coincidence a happy solution to both problems. In any case, General Sherman's directive was the real birth of the United States Army school system as we know it today.

Across the Avenue

There had been special schools for various segments of the Army prior to that time. The Engineer School at Willets' Point, dating from 1866, claims seniority, but *The School of the Line*, second of Leavenworth's many designations, was the first institution Army-wide in scope. Branch schools followed irregularly—some, like the Field Artillery School at Fort Sill, not being started until World War I. Our top-level school, the Army War College, opened unobtrusively in 1901 in two converted residences, across Pennsylvania Avenue from the White House, following a reluctant Congressional approval of a United States Army General Staff.

Although a digression, a glance at the Navy's parallel progress is interesting. Bitter strife within the Navy Department attended the early years of the Naval War College, founded at Newport in 1884 by Captain Stephen B. Luce. Securing the

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services of his former lieutenant, Alfred Thayer Mahan, and, "a brilliant young Army officer, Lieutenant Tasker H. Bliss," as lecturers, Luce maintained a precarious existence for his school. In June 1886, when Luce was ordered to sea duty, Mahan became superintendent.

An odd quirk of history links the Naval War College to Army educational ideas. Luce credits General Sherman—in their Civil War contacts—with influencing him to "develop naval warfare by research and the inductive system of philosophy, from the empirical stage to the dignity of a science." Since Sherman received his instruction in strategy and tactics from Professor Dennis Mahan at West Point, we might not be rash in concluding that son Alfred, in his parentally-frowned-upon naval career, was by this devious road carrying out father Dennis' original ideas.

The Naval Academy long opposed the War College, contending it should be a graduate branch of the School on the Severn. Later, establishment of graduate schools in engineering and administration at Annapolis terminated the feud.

However, it was not until after World War I that the Navy opened a staff college (also at Newport) comparable to Fort Leavenworth although their War College preceded the Army's school of like name by almost 20 years.

Universities or Colleges?

With its Air University at Maxwell Air Force Base, the Air Force has, since its establishment as an independent service, followed naval rather than Army precedent, combining its graduate schools both institutionally and geographically. The Army made two unsuccessful attempts to similarly combine its colleges. The first board charged with setting up a War College recommended Fort Leavenworth as the location. Again in 1950, the reconstituted Army War College (the original having been turned over to the Department of Defense as the National War College) held its first annual course at Fort Leavenworth before moving to Carlisle Barracks for permanent station. Thus, the Department of Defense contains examples of complete (Air Force), and partial (Navy), centralization for its graduate schools along with the Army's penchant for decentralization—speaking geographically, at least.

Finally, to bring us up to date, the prodding of the War Department (Gerow) Board in 1946 resulted in our first permanent joint schools for Army, Navy, and Air Force. This brought the Armed Forces Staff College into being at Norfolk and converted the erstwhile Army institutions in Washington, D. C. into their new interservice roles of National War College and Industrial College of the Armed Forces. Incidentally, selected representatives of the State Department and other civilian agencies attend these last two institutions as students in addition to furnishing some faculty members.

Opinions—Fixed or Otherwise

Thus, by a succession of highly disjointed steps, we have traced an outline of Army education from early times to mid-twentieth century. The vital role it has played in our history is indicated by several historic statements.

Following the Mexican War, General Winfield Scott announced his famous "fixed opinion that the graduated cadets of the United States Military Academy" were the principal cause of the unbroken series of battle victories in that war. Scott himself never attended West Point.

After the 1918 armistice, General John J. Pershing bespoke himself to the effect that officer training at the Command and Staff School (now College) alone, made possible the successful conduct of battlefield operations for large armies by men who a few short months earlier had never

seen a division. General Eisenhower gave similar testimony in 1945.

Last, and perhaps most convincing because it came from a distinguished foreigner exceptionally qualified to evaluate military matters, is this comment by Sir Winston Churchill:

One of the greatest miracles of this conflict [World War II] was the staff work of the world-wide military forces of the United States. That so vast an undertaking could have been successfully prosecuted by so small a body of trained men is a resounding tribute to the training of the United States military schools.

The United States military school system is by no means static. Since the Gerow Board, the Eddy Board, under the leadership of Lieutenant General Manton S. Eddy, then the Commandant of the Command and General Staff College, has recorded another thorough study of Army education.

Deranged somewhat by the exigencies of the Korean conflict, the recommendations of the Eddy Board have been accepted and gradually put into practice by the Department of the Army. Recently, a long term policy of that Board replaced a crash program for junior officer education.

The misnamed "Associate Company Officers Course," to which all newly commissioned officers—other than Officer Candidate School graduates—were sent, has been revamped as a Basic Officer Course, teaching duties primarily at platoon and company level. The Eddy Board's Company Officer Course, 5 or more months', instead of 12 weeks', duration, has been added to the system for officers with approximately 3 years' service.

Schooling for Reserves

The Army's educational program for Reserve officers is complicated by the several varieties of official status which these officers may possess. Reserve officers on extended active duty are eligible, under identical conditions, for selection to the same schools as Regulars. If comparatively few actually receive these appointments, the reasons are: first, the Regular Army school system is barely adequate to the needs of that permanent force leaving little room for additional students and, second, there is no assurance the extended active duty officer will continue in the service to render the government the benefits of his education. Occasionally, Reserve officers, not on extended active duty, win assignments to Regular courses at Branch or higher schools.

Reserve officers who can avail themselves of only short tours of active duty are normally sent to so-called "Associate" or short versions of Regular courses. These courses are veritable cram schools, by necessity. Their purpose is to educate Reserves to the maximum degree possible during the short periods the students can spare from their business or professional careers.

Supporting resident instruction, Reserves and Regulars have long had available a series of correspondence courses, prepared and administered by the several Army schools, and—since World War II—a nation-wide network of night schools—operated and taught by Reserves. Called United States Army Reserve schools (USAR), these institutions have expanded and improved greatly since their organization. Aided and advised by Regular Army officers, USAR schools are conducted entirely by Reserve officers on inactive duty. Students are assigned, or accepted on a voluntary basis, depending upon their inactive duty status.

A recent proposal, now under study, contemplates a 12-year co-ordinated program for USAR schools and for the extension instruction which parallels them. This program allots 3 years to each of the four levels—Company (Branch), Ad-

vanced (Branch), Division, and General Staff—proposing 48 hours of classroom work (24 nights) as the yearly stint. Fifteen-day tours of active duty every summer would round out the program. Obviously this is a forward step.

The correspondence schools—called extension courses—serve Reserve officers (and Regulars as well) between, or in lieu of, their attendance at formal schools. These courses parallel the school programs. In point of numbers, they are by far the major element in the Army's graduate school system.

The Korean conflict put the Army into an unprecedented quandary regarding its Reserve components. In time of actual war, formal schooling inevitably dwindles to cram courses on a "need to know" basis, with Regulars and Reserves on a common footing. Now, for the first time in our history, we have large numbers of Reserves on extended active duty alongside the Regulars in an Army whose school system is geared to instruction of Regulars only—with no room to expand appreciably. That outlines—without attempting to solve—the Reserve officer educational program now receiving so much deserved attention.

Enlisted Schooling

For enlisted men we cannot dignify the considerable facilities available with the formal title of program. Once primary instruction—basic training averaging 16 weeks—is completed, an enlisted man's further schooling depends largely upon the personal equation—the soldier himself and his immediate commanding officer.

The Army administers aptitude tests in 10 groupings which are employed to determine what types of further training would be suitable for each enlisted man. Whether he actually seeks—and is accepted for—courses in the numerous specialties will be decided largely by the soldier's own ambition and his unit's need for specialists.

"Career Fields" are mapped out rather rigidly in specialties such as Food Service—with its cooks, mess supervisors, dieticians, and the like. They are far less rigid in, for example, engineer heavy equipment operation. In career fields like this, an enlisted man may progress—both in skill and promotion—through "on-the-job training" in his own unit almost, if not quite, as fast as by formal schooling.

Beginning with World War II, the Army has assisted personal study at high school and college levels through the facilities of United States Armed Forces Institute (USAFI). Courses are free for enlisted men and very inexpensive for officers in many areas of general education. They must be pursued on the individual's non-duty time and may lead to diplomas and degrees from recognized schools and colleges.

By means of the Information and Education Program, the Army seeks to inform all military personnel, by publications, lectures, and conferences during duty hours, of matters of national and international significance.

Thus, not only training but advanced education receive thorough attention in today's Army. The demands of rapidly advancing technologies and tactics must be continuously taught to officers and enlisted men. At the same time, the Army's official and elective school system returns better educated, as well as technically trained, citizens to civilian life at the termination of their military service. These policies, characteristic of the role of the Army in modern democracy, make a worthy contribution to national educational progress.

AIR FORCE ECONOMY

Lieutenant General Robert W. Harper, *United States Air Force*
Commander, Air Training Command, Scott Air Force Base, Illinois

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

ON THE defense payroll we have some five and one-half million people. About three and one-half million in uniform in the services, a little less than one and one-half million American civilians, and about one-half million foreign nationals—largely Germans, Japanese, and Koreans.

In a recent issue of Harvard Business Review, Eugene S. Duffield discussed the "bigness" of defense business. He pointed out that the 1952 sales of 12 of the largest corporations in America would have to be piled one on top of the other to equal the expenditures of the Department of Defense. The Defense Department's civilian and military personnel could man one-quarter of all the manufacturing industries in the country.

The Air Force makes up just one part of that "bigness." And we are not deluded into thinking that our operation is good, simply because it is large.

The United States Air Force has been charged with the responsibility for prudent, judicious use of over 11 billion dollars in Fiscal Year 1954. This is a grave responsibility which no one individual alone can discharge.

The Dilemma

As you well know, this budget was not conceived in a vacuum. It is, instead, the product of a long hard look at the realities of the world struggle against communism. In the determination of this budget is represented the considered judgment of experienced, patriotic men who labored to solve a problem which approaches dilemma. The dilemma was this: on the one hand, if we provide insufficient strength for ourselves and our allies, we invite military disaster from Communist enemies. On the other hand, if we spend too much for too long, we invite economic strangulation and an even easier victory for our enemies. A delicate balance must be maintained if we are to avoid these two extremes. We must husband our resources to meet long-range economic warfare as well as an overnight "blitz." And, once the budget is determined, it is our duty to fit our activity, economically, within that budget.

Now, I am not an alarmist. I feel that this problem of avoiding economic strangulation as well as military disaster, although urgent, is still no cause for alarm. It is simply a problem which can and will be solved by the Air Force and, I am sure, by all of the services through intelligent internal analysis of our operation and by positive action to correct weaknesses apparent through such analysis.

In short, it is a problem which demands sound business management.

Basically, the Air Force is working under the premise that although our motive is one of patriotism rather than of profit, we should still conduct our military affairs and employ managerial techniques, as nearly as possible, just as private enterprise does. I feel that this is a sound premise on which to base our activity, since the techniques of private

business in America have made American economy the most progressive in the world.

Business Practices

I believe that we are employing business practices as nearly as possible in our military affairs. There are some factors which limit the extent to which business practice can be applied to the military.

Fundamentally, the function of business is both creative and productive. Warfare, by its very nature, involves death and destruction of property and equipment. However, this does not mean, that because war is wasteful, military men are incapable of understanding the business meaning of the word "economy." True, "economy" carries a somewhat different meaning for us. "Economy" to the Air Force, means the husbanding of human and material resources in the simple terms of survival, rather than in the business sense of profit or loss.

Doubled in Size

In addition, the vast scope of Air Force management presents a problem. We are often faced with the necessity for rapid build-up and then later, swift retrogression. For example, our Training Command stepped up production 20 percent in the first week of the Korean conflict, and within 18 months after the conflict started, the entire Air Force had doubled in size. Practically all of the personnel necessary to man our most complicated machines were trained within our own facilities. Imagine any business doubling its size in 18 months with no help in the form of trained personnel. There would be some mistakes made, just as we have made mistakes in the last few years. This matter of a rapidly fluctuating program is one of the most serious problems which we have to solve.

Personnel Problems

Another problem in the military approach to business management is that personnel-wise we are faced with a constant turnover. To add to this problem—because of the increasing complexity of weapons—we must provide longer periods of training before we can realize full productive value from our trained people.

Also, we deal with young men in the 18 to 26 age bracket, who enter the Air Force in a continuous flow, lending a measure of immaturity to the over-all personnel picture. These are the men who must be trained to maintain and to fly extremely complicated machines costing millions of dollars.

It is evident to any business manager that a fluctuating program with a rapid turnover in personnel engenders uneconomical operation. Peaks and valleys in any operation are costly. Normally, because of the very nature of the military establishment as an instrument of national policy, periods of emergency will force us to peak operation. However, in the *present* world situation, it is quite evident that this nation must provide for herself dual-purpose defense forces. Forces which first will exert the greatest possible influence toward restraining the Soviet Union and her satellites from starting other wars; and which, second, will ensure our survival if we are attacked. It is further evident that we must maintain these defense forces for some time to come.

We must succeed in our effort for sound business management for there is no such plea as bankruptcy in the business of defense. We have a nation of stockholders who must be assured of an adequate defense

We Americans are accustomed to rearming on a large scale only when in full scale war. We are, therefore, in the habit of measuring our mobilization in terms of short, intense, and, in fact, extravagant bursts of activity, followed by an equally precipitate disarmament when victory is achieved.

We must change that thinking. Emanating from the Secretary of Defense and the Joint Chiefs of Staff down through every level of activity within the Air Force, has come the concept that now we must rapidly reach a military level which permits our defense machinery to act as a deterrent force and as a readiness force. And we must maintain that level, as *economically* as possible, until the requirement for such a dual-purpose force ceases to exist.

This concept will do much to ease the problem of peaks and valleys in our operation. Roughly, under this plan, the Air Force is required to raise its combat effectiveness approximately 50 percent with little increase in personnel. It is quite obvious that we can do this only by sound and effective management of our resources in materials, manpower, money, and time. We cannot have the biggest Air Force, but we are determined that we will have the best.

Personnel Turnover

Now, in regard to the personnel turnover in the Air Force, admittedly our control over this problem is somewhat limited. This is a single problem worthy of separate discussion since so many diverse factors bear upon it.

But, we realize that the Air Force cannot hope to retain as professional military men all of the individuals who enter the service. We do not want to retain all of them. We are fully cognizant of the fact that there must be a balance between the number of men on active military service as professionals, and the number who serve briefly and return to civilian life.

A Sound Investment

Those people who return to civilian life after military training represent a tremendous potential reserve which can be called upon in the event of emergency. True, we would prefer to retain, as long as possible, those men whose training represents a considerable expense in money and time to the Air Force. This is only good sense—good business management. But even in those cases where a highly-trained Air Force technician leaves the military for civilian life after a minimum tour of duty, he is not totally lost as an asset to the nation. Usually the highly-trained man is seized upon by civilian industry because of his valuable training. He, therefore, represents a sound investment to the nation as a whole. However, the price of this investment is charged completely against the Air Force.

Training Methods

It is obvious, however, that whether a man stays in service or returns to civilian life, it is still of the utmost importance that the training he receives in the Air Force be the best. And, therefore, intelligent and scientific methods must be employed in the testing, placement, motivation, and development of these people while they are in the service. Through prudent handling of each individual, we can make his military career more appealing and more productive. If

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Lieutenant General Robert W. Harper, United States Air Force, graduated from the Military Academy in 1924 and later served at West Point as a Tactical Officer in 1938. Originally commissioned in the Infantry, General Harper transferred to the air arm and completed his Air Corps Primary Flying School training at Brook Field, Texas in 1925. He graduated from the Advanced Flying School, Kelly Field, the following year. He graduated from the Air Tactical School in 1937 and the Command and General Staff School in 1938.

he decides to return to civilian life, we can ensure that he returns as a well-adjusted citizen and a well-trained, valuable addition to the nation's pool of technically skilled people.

Now, the responsibility for the testing, motivation, and training of Air Force people rests with my Command—the Air Training Command. We turn out a product for which there is an unlimited demand—the trained individual. His training is our business. It is an operation which calls for the exercise of good business management on the part of everyone concerned with his training. We must exercise that management from the time that individual enters the Air Force until we are in a position to offer him to our consumer agencies within the Air Force and say "Here is a man trained for the job you require."

Management

I would like very briefly to discuss the management approach which we have used in our business operation.

Basically, the Air Training Command must provide the entire Air Force with people trained in over 300 separate job specialties. Some of these specialties are so complex that they require almost 2 years of training before one enters the field at the beginner's level.

Testing

Because of the tremendous scope of Air Force requirements, it was decided to establish a strong human resources program to help us determine where we could use our human resources most judiciously. The Human Resources Research Center was established, therefore, to discharge our testing function. The Center is staffed with trained psychologists, many of them leaders in their fields in civilian institutions. After exhaustive study, these men succeeded in isolating and identifying the skills needed to perform the various jobs in the Air Force. Based on their findings, they devised a series of tests. These tests are given to each airman when he arrives at the basic military training stations of the Command.

Each new airman is tested to determine his capabilities. There are complex groupings of 14 tests in all. By studying test scores, we can determine whether a man would be more at home behind a clerk's desk, before a radio set, or on an aircraft mechanic's stand. We get a picture of the man's personal abilities. This is the logical first step toward directing those abilities intelligently.

Tested Tests

I want to emphasize that no man's abilities are defined on the basis of psychological theory. No test is used until it has been proved a valid yardstick for predicting success or failure in a specific area of endeavor. In fact, we can predict the percentage of successful graduates from each course of training with astonishing accuracy by means of these tests alone.

Stanine Rating

Let me give you an example of one area in which we have placed a yardstick on specialized human ability. Each potential flying man is given a stanine rating. The word "stanine" is a contraction of two words, "standard nine," and refers to the rating scale for these tests. The scale goes from "one" to "nine."

The potential flying trainee is given a group of written and practical tests. The practical tests are called "psychomotor" tests and they measure a man's ability to co-ordinate physical movements, to react mentally, and to make sound, quick judgments.

When the tests are tabulated, each man is rated on a scale. A score of "nine" indicates a most qualified individual, and a score of "one" a least qualified

individual. We have found that a man who receives a "nine" rating, as a potential pilot, for instance, has a 91 percent chance of successfully completing pilot training. We can determine how many men of a certain stanine rating must be entered into training in order to produce a desired number of pilots or observers. The impact of the stanine rating system on increased quality and in money savings to the Air Force, is obvious.

Let me make it quite clear that we are not classifying men. The classification of men is a working expedient for certain administrative purposes, but it is never a substitute for clear thinking in the treatment of individuals. We are, instead, measuring men's *aptitudes* for various types of training. We are using a predictive process which has been proved valid.

Analysis and Development

Once we have tested an individual and determined his capabilities, we must then be certain that the training which we provide takes him to the highest level of his capabilities. We lose money, we lose time, and we lower efficiency when we train a man and place him in a job in which he can operate at "half-speed."

Within the Air Training Command, there is another agency which performs a continuing evaluation of our training program and assists us in determining the effectiveness of all areas of our training. This organization is the Training Analysis and Development Directorate. Personnel, with both civilian and military educational experience, make up the staff of this directorate. There are 43 bases in the Training Command—all in the business of training people. And at each of these bases, the commander, as the business manager, has available to him as advisors, personnel from the Training Analysis and Development (TA&D) field. These TA&D people act as a quality control agency on our product—the trained individual. They continuously seek answers to such questions as these:

"Are we turning out graduates who satisfy the needs of our using agencies?"

"Can we provide the same or better training for less money?"

"Are there areas of overlap in our training which can be eliminated economically?"

They provide answers—based on tested methods of evaluation and analysis—for these and any other questions which a commander may pose in his search for improved management.

Accomplishments

In developing our training, we have worked closely with public education. We have drawn from their experience. And, I am quite proud of the fact that, in the field of specialized education, we have achieved results which have aroused the interest of educators throughout the United States. In 1952, a group of educators from the State of Pennsylvania visited our headquarters and stations of the Command. Their reaction to what they saw in the field of specialized education was such that they recommended similar visits to other state departments of education. In June 1953, 30 leading California educators traveled throughout the Command to see, first hand, what we have accomplished in our training program.

Cost Control System

As a further judge of the total effectiveness of our management operation we employ a Cost Control System.

The Cost Control System is designed to overcome the tendency on the part of military managers to think only in terms of dollars over which they themselves have control, rather than in terms of total dollar costs of their activities. Functions such as food service, supply control, supply warehousing, cost of op-

erating base hospitals and the like are included in the cost system. Cost standards are developed for each one of these functional areas. We can, therefore, provide the base commander with realistic cost standards for most of his functions. These also give us a guage of his effectiveness and tend to stimulate a bit of competitive spirit among our commanders.

Accounting

In addition to the Cost Control System, we are shooting for improved management by providing better operating and control reports through an integrated accounting system. Under the integrated accounting system, we propose to follow appropriated dollars from the point of expenditure or conversion to usable assets, through storage and while in transit, and then on to final consumption when the cost or expense is actually created. It will take some time, but under this system all assets will be under accounting control and we will be able to provide statements of our operations patterned after those which are employed in businesses.

We have established an incentive program for our employees, which in the Fiscal Year 1953—in the Air Training Command alone—brought us an estimated savings of over one and one-half million dollars. This savings resulted from adopting almost 800 suggestions from our people.

And, we have gone much further into the field of internal communications.

This is a field in which I have a particular interest. The effectiveness of any management program is increased immeasurably through the use of an intelligent internal information program which interprets management's activities for the individual employee. Such a program is the most effective weapon with which to combat the damaging effects of rumor, misinformation, and idle gossip.

For as you know, even the most enlightened decision of management takes on the aspect of a random move without purpose or direction when it is permitted to filter down haphazardly via the "grapevine" to the individual employees.

To avoid this situation and to ensure a continuous flow of other factual information to all levels of activity, we have established a Career Information Program within the Air Training Command. This program is aimed at interpreting Air Force policies and Air Training Command policies for our people. In addition, the program works to place clear and factual information, on other subjects, in the hands of our servicemen and women. This information is not necessarily of a military nature but encompasses all matters which affect the interests of our people as airmen and as citizens. One of the chief strengths of the American public lies in the fact that it is an *informed public.* We are anxious to preserve that strength in our people.

Summary

I have touched on just a few areas of management in the Air Training Command. It would not be feasible to attempt to discuss them all in this article, for management is synonymous with command, and, of course, command is an all-inclusive function.

I would like to close with the thought that we in the Air Force are not complacent in our present management program. We realize that there is room for improvement, but I am quick to point out that we are not hesitant to take action to improve our management.

For instance, we have established an Air Force management and manpower course at George Washington University. This training, from its inception, has received the full support of top Air Force commanders. Established during General Hoyt S. Vandenberg's tenure as Chief of Staff of the Air Force, the opening of

each course is marked by the appearance of one of the senior Air Force commanders to address the student body. General Vandenberg himself delivered the address at the start of the first course of instruction. I was privileged to speak at the opening of the course in February 1953. I noted the interest and enthusiasm with which these officers begin their training. I am certain that their future accomplishments in improved Air Force management will be a reflection of this interest and enthusiasm.

In addition to George Washington University, other civilian institutions assist us in the management training of our people. Pittsburgh University and the Universities of Chicago and Michigan also provide management training for selected Air Force officers.

A number of senior officers have been sent to the regular 2-year course at the Harvard Graduate School of Business Administration. My present Chief of Staff, Brigadier General Augustus Minton is one of those officers.

Through such training, the Air Force hopes to expand its foundation of trained business executive experience within the Air Force. Remember, only since 1947, when we achieved autonomy, has the Air Force been in business for itself.

I have instructed each of our commanders to take a realistic view of their operation in light of the continuing urgent need for sound management. After they look, I want them to act. I want them to decide what must be done and then delegate their authority to their junior officers and give our younger men the experience of doing the job—and if necessary, of making mistakes. This is the only way we can ensure a healthy future Air Force—an Air Force which will be respected, and an Air Force of which all Americans may be confidently proud.

No Bankruptcy in Defense

We will succeed in our effort for sound business management. We *must* succeed for there is no such plea as bankruptcy in the business of defense. We have a nation full of stockholders. They ask no dividend but the assurance of adequate defense for their country and for the way of life which they cherish.

The trust of the American people is a compelling force. It is a force which moves all of us in the military, steadily toward our ultimate goal—a level of strength for our nation which will ensure peace in the world.

In the total air defense system, the fact is that no important element can be jiggled without jiggling the whole system. The time has passed when a proposed new weapon or other component could be judged on its own merits alone; it must now be looked at in conjunction with dozens of other equipments.

Major General James McCormack, Jr.

HISTORY AND THE MILITARY PROFESSION

Brigadier General Paul M. Robinett
United States Army (Ret.)

This article will appear as the opening chapter of a forthcoming revision of a text entitled The Study and Writing of American Military History: A Guide.

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

THE value of history in military education has always been recognized in the United States Army as in most armies. It has been at the very base of instruction in the Military Academy and the service schools and colleges since their inception. In this emphasis on the value of history in military instruction, the American Army has followed the advice of such great captains as Frederick the Great and Napoleon, as well as others who have more recently made their mark on the pages of history. Napoleon has written, ". . . the knowledge of the higher arts of war is not acquired except by experience and the study of history of wars and the battles of great captains." General George S. Patton, Jr., one of America's great offensive battle leaders, also emphasized the importance of history. His words, written on the battlefield, were: "To be a successful soldier you must know history, read it objectively—dates and even minute details of tactics are useless. . . . You must [also] read biography and especially autobiography. If you will do it you will find war is simple."

There are dissenters from this point of view, however. Marshal Wavell, for one, holds that the study of psychology and leadership are of greater importance to a military man than the study of operations, contending that Napoleon's military success can be attributed to his knowledge of psychology rather than to his study of rules and strategy. And Le Bon, who was not a military man, has condemned histories on general principle, observing that "they are fanciful accounts of ill-observed facts accompanied by explanations the result of reflection" and that the writing "of such books is a most absolute waste of time."

Notwithstanding these opinions, which are not without value as a challenge to historians, it must be concluded that the study of past wars is fundamental to preparation for the next, for current military problems cannot be solved without an understanding of the past from which they stem. Every individual in the military service, from the basic private to the Chief of Staff of the Army, will find a knowledge of military history, and espe-

The accomplishments of the United States Army, both in peace and in war, are so outstanding that every soldier can gain inspiration from the records of past achievements even though they are imperfectly told

cially of American military history, valuable in the solution of problems, both in peace and in war. Heeding the inscription carved in stone at the entrance to the National Archives—"What is past is prologue"—the soldier must be rooted in the past to understand the present that he may project himself into the future.

Esprit de Corps

The accomplishments of the United States Army in both peace and war are so outstanding that every soldier can gain inspiration from the record of the past even though still imperfectly told. During the comparatively short span of American history, the Army has fought brave and skillful soldiers of many races and in many lands. These operations have ranged from desperate hand-to-hand engagements with savages, equipped with bows and arrows and tomahawks or spears and bolos, to vast battles with armies landing in the face of modern forces and driving them back to the center of their empires. The Army has also played an outstanding role in discovery and exploration; in great engineering undertakings that have joined the oceans, developed ports and harbors, harnessed and controlled rivers, and developed the atom bomb; in medicine and hygiene; and in communications and aviation. It has also been the training ground of scholars, scientists, administrators, educators, diplomats, and statesmen who have made great contributions to every phase of American life.

A knowledge of its accomplishments can play a vital role in the development of *esprit de corps* in the Army. But as Fortescue, the eminent British military historian, has said,

without knowledge of military history men are reallly unconscious of the existence of the most wonderful of moral forces . . . ; and it is not a thing of which anyone can afford to be ignorant.

In line with Fortescue's warning, the United States Army has called upon military history in many ways. In the Information and Education Program, the soldiers are informed of past heroic deeds and accomplishments of individuals and units and are furnished *The Soldier's Guide*, containing historical material. Army posts are generally named for widely-known military men; buildings and streets for others, or for military organizations. Colors and standards are decorated with streamers carrying the names of battles or campaigns in which the unit has honorably participated. For many years *Retreat* has included *The Star Spangled Banner* which was inspired under the "rocket's red glare." In many units, mounts and vehicles have borne the names of distinguished soldiers of the past. Such things can be turned to advantage by those who will take the trouble to weld the deeds and records of the past to the task in hand and, if successfully accomplished, the Army-in-being will live and function in the best traditions of the past.

Morale

In speaking on morale in modern war, General of the Army George C. Marshall once said:

The soldier's heart, the soldier's spirit, the soldier's soul, are everything. Unless the soldier's soul sustains him he cannot be relied on and will fail himself and his commander and his country in the end.

It is not enough to fight. It is the spirit which we bring to the fight that decides

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the issue. It is morale that wins the victory.

Morale is the state of mind. It is steadfastness and courage and hope. It is confidence and zeal and loyalty. It is elan, esprit de corps *and determination.*

It is staying power, the spirit which endures to the end—the will to win.

With it all things are possible, without it everything else, planning, preparation, production, count for naught.

General Marshall's thoughts are of the individuals who collectively make up a unit and the entire Army.

General William T. Sherman has given his views on the importance of the spiritual side of the Army in these words from *Personal Memoirs of General W. T. Sherman*:

There is a soul to an army as well as to individual men, and no general can accomplish the full work of his army unless he commands the soul of his men, as well as their bodies and legs.

General Patton, a profound student of military history and leadership, on several occasions during World War II also noted the unit soul, physically symbolized by the colors and standards.

It can thus be seen that both Sherman and Patton broadened the concept to include the unit as well as the individual in the broader problems of morale. They thought of the individuals of a unit welded together by a leader and given a common soul. The creation of this unit soul is the continuing problem of all commanders from the lowest to the highest, and the problem becomes more difficult when economy and military administration abolish the props which support the commander. But, regardless of handicaps, the quality of a leader is the true criterion of the soul of a unit. He is the one who must inspire the individuals of the outfit and weld them into a whole capable of withstanding all hardships and sacrifices so beautifully illustrated by Captain Nathan Hale as he stood on the enemy's gallows on the morning of 22 September 1776 and said: "I only regret that I have but one life to lose for my country."

At the very base of the problem of morale is patriotism or love of country—the cement that binds a people together and sustains their armies. Without it neither the people nor the Army has a soul. In writing about patriotism, General Ian Hamilton in his *The Soul and Body of an Army* said that it is,

a plant whose best nutriments are blood and tears: a plant which dies down in peace and flowers most brightly in war. It does not calculate, does not profiteer, does not stop to reason: in an atmosphere of danger the sap begins to stir; it lives, it takes possession of the soul.

A truly great military historian will capture this spirit which plays such an important role in the outcome of battles, campaigns, and wars. A mere recitation of events will fail to probe the depths of the brew and is of little value to leaders of men.

Intangible Symbols and Morale

Intangible symbols of the unit's past consist of customs and traditions around which the outfit builds distinctive special observances and practices. Examples of these are almost endless in number and variety. Some of the most widely practiced are the celebration of important unit anniversaries, minor distinctions of drill and command, and distinctive greetings and replies. For example, an individual of the 13th Cavalry on receiving an order or instructions would salute and reply before departing, "It shall be done." The 7th Cavalry once included saddled but riderless Comanche, the lone survivor of the Battle of the Little Big Horn, in its

parades. In 1922, the 3d Infantry Regiment was granted permission to march on all ceremonial occasions with fixed bayonets in honor of its gallant assault with the bayonet at the battle of Cerro Gordo on 18 April 1847.

It is a mistake to try to invent a tradition or to initiate the observance by a unit of some custom merely read or heard about. To be really meaningful a custom must originate spontaneously out of some battle event or important experience of the unit. Even such an incident is not likely to grow into a custom unless it is spontaneously passed along and repeated. It is well for the unit to be alert for instances, spontaneous remarks that "catch on" in the unit, and other happenings that might be made the basis for future ceremonial observance. Before many years have passed the observance may well grow to the stature of tradition or even take on a more tangible form. Many examples showing how incidents of service have been perpetuated can be cited.

Lieutenant General Winfield Scott was a colorful leader with ability to express himself in words that have become the heritage of units that once served under his command. After the fall of Chapultepec, 13 September 1847, the 3d Infantry Regiment was put at the head of the column making formal entrance into Mexico City. Mounted with his staff, General Scott waited for the procession in the outskirts. When the 3d Infantry came abreast, Scott, in a dramatic gesture, swept off his hat and said to his staff, "Gentlemen, take off your hats to the Old Guard." This nickname has persisted and is in use today. On the same occasion, he addressed the Regiment of Mounted Rifles as follows, "Brave Rifles! Veterans! You have been baptized in fire and blood and come out steel." Since that time the regiment has proudly called itself "Brave Rifles" and its unit insignia is emblazoned with that name.

The 13th Infantry earned its name, "First at Vicksburg," as a result of the gallantry displayed by its 1st Battalion on 19 May 1863. On that day, in a frontal assault, the 13th planted and maintained its colors on the Confederate parapet for as long as the attack persisted. In doing so, it lost more than 43 percent of its men. Authorization for the unit to inscribe this motto on its colors came from a board of officers of the XV Corps on 12 August 1863.

The 19th Infantry has for its motto, "Rock of Chickamauga." It earned this name while serving in the corps commanded by Major General George H. Thomas in the Battle of Chickamauga. Stationed on the left of General Thomas' line on 19 September, the regiment bore the brunt of the fiercest assaults. The next day, when their ammunition was exhausted, the men held their ground with bayonets. Seventy-five percent of the regiment was killed or wounded. At length the command devolved on a second lieutenant. To commemorate this incident, it later became the custom for the junior second lieutenant of the 19th Infantry to command the regiment on each Organization Day, 20 September.

Another example originated with the proud remark of an unknown soldier during the Civil War. During that war certain corps had adopted distinctive badges, a custom which has continued in the United States Army. But the XV Corps, commanded by Major General John A. Logan, had not done so. One of the men of the corps, on being asked what his badge was, replied, "Forty rounds in the cartridge-box, and twenty in the pocket!" On hearing the story, General Logan promptly adopted the cartridge-box and forty rounds as the corps-badge.

One of the most effective intangible symbols is a unit march or song, particularly one that has been associated with the outfit for a long time. Most of the

older regiments have these songs or marches. The 7th Cavalry's *Garry Owen* is an example of a song that has contributed materially to the morale of that regiment for many years. With the passing of the regimental bands, however, a special effort will be required to preserve such songs and marches. The different arms and services also have many good songs and marches, and there are others of Army-wide interest. Perhaps the most famous of the branch songs is Lieutenant Edmund L. Gruber's *The Caisson Song*. In a much more important way, *The Star Spangled Banner* and *Battle Hymn of the Republic* have played an outstanding role in developing morale in the Armed Forces since they appeared. New songs and marches originating spontaneously within the Army from time to time can also play an important part in the development of morale in units, in the arms or services, or in the Army as a whole.

Unit History and Morale

The color-bearing units are the military families within which the broader soul of the Army is built. It is these families which the division commander, without infringing upon subordinates, welds into a composite team. These units are corporate entities having a legal existence even though their actual personnel may vary from war strength, when on active service, to zero when on an inactive status. Therefore, every unit has its own history which is distinct from all others. It may have a history extending back before the founding of the Republic, a brief history, or, in the case of new units, no history at all. In any case, however, each unit shares the history of the United States Army. Any unit, therefore, can utilize pride in the Army's past accomplishments to foster soldierly conduct, pride of outfit, and love of country. Newer outfits, like younger brothers, should strive to excel their seniors.

If the organization is in garrison, histories of the United States, of the United States Army, of appropriate campaigns, and of the unit, if available, and *The Medal of Honor of the United States Army* should be in the company reading and recreation rooms. If practicable, condensed versions of the unit history should be prepared and issued to each individual upon joining the organization. In any case, it is desirable for the commanding officer to inform new men, before they enter upon their duties, of the records of heroes who have gone before, and of the unit's and the Army's accomplishments.

Leadership

Leadership being the very foundation upon which a successful military career is built, it behooves all officers to study it assiduously. They can best do so by studying the general principles of leadership and then by critically reading the biographies and memoirs of past military leaders with a view to determining the reasons for their successes and failures. But it is not enough merely to make an analysis of the qualities and methods of past leaders. The qualities and methods others have displayed are unique to the individuals concerned; they are not entirely suited to any other. Nevertheless, they can teach an individual of judgment what to avoid and what to emulate and can help him shape and develop his own qualities for the better. To do so, however, it is essential that the individual add the experiences of others to his own and acquire qualities and methods suited to himself.

Although there is a paucity of good biographies and memoirs, particularly in the lower echelons of command, this material is the best available for an understanding of character, of the characteristics of men, of good and bad leadership, and of the influence of eminent personalities upon events. Military works *dealing*

with the rank and file, such as Bolton's *The Private Soldier Under Washington* and Wiley's *Billy Yank*, should be read with the realization that bad soldiers tend to leave many documents behind them, while good soldiers leave only the briefest sort of records or merely a name. For this reason even so-called "factual studies" of the fighting men are usually heavily loaded on the seamy side of life.

If study is to be profitable, the student must analyze, evaluate, and judge the qualities of both fighting men and leaders, with due regard to the circumstances and conditions under which they worked. But as Wilkinson has said, "This judgment must never degenerate into mere negative criticism. . . ." It should enable the thoughtful student to determine and to identify in others the desirable traits of soldiers and leaders in both staff and command positions. This should enable a military man to become a practical psychologist, but should not lead him to become pedantic or academic. As Clausewitz has pointed out, a commander

need not be a close observer of men, a sharp dissector of human character, but he must know the character, the feelings, the habits, the peculiar faults and inclinations of those whom he is to command.

To be of maximum value in teaching military leadership, historical works must be factual and frank. Propagandistic history or censored history is dangerous and should not be used as the basis of instruction in military schools or in training. Such history is not history at all. It can provide no sound lessons or basis of intellectual and professional training. It leads to false conclusions. And it fosters one of the worst evils in professional military thinking—self-deception. Histories written during the lives of the actors or too near their era are generally tinged with prejudice, colored by self-interested flattery, and influenced by the selective treatment of source material. Histories written too long after the time of the participants are frequently fictional or sentimental. History cannot, therefore, serve as an entirely satisfactory basis for instruction in leadership until it portrays the participants' whole—their merits and deficiencies, their temperaments, doubts, ambitions, their *Janus* faces, their tensions and contrasts, and their physical and mental conditions.

Although the study of great captains is important to all military men, the study of "followship," as exemplified by subordinate leaders and staff officers, is equally important and perhaps more so because few can rise to the topmost position and even these must pass through the various grades in both staff and command assignments. General Malin Craig, former Chief of Staff of the United States Army, emphasized this aspect of a military career in this advice to a graduating class at the United States Military Academy:

No young officer can be unconscious of the impression he is making on others. And yet he would be wrong to govern his conduct solely by the opinions of others. First of all he must to himself be true. Fortunately, by a happy paradox of human nature we best serve ourselves when we think only of serving others. An officer . . . should make it a cardinal principle of life that by no act of commission or omission on his part will he permit his immediate superior to make a mistake. Once an officer establishes such a professional reputation his future is assured. His services will be eagerly sought and his assignment to duties of the highest importance is certain.

A comprehensive knowledge of military history, emphasizing both leadership and followship, will facilitate mutual respect and understanding in the Armed Forces;

the broad problems of the higher commanders will be more readily comprehended by subordinates, and the complex human, material, and physical problems of the soldier and of the small-unit commanders better appreciated by superiors.

Instruction and Training

Military history is the very foundation of our knowledge of tactics and strategy. It is also the foundation on which the theoretical and practical training of troops and the development of training directives are based. It gives life to the bare bones of facts and regulations. An instructor who is not grounded in military history appropriate to the level of his instruction is dry and pedantic and will accomplish no great results. On the other hand, one who not only knows the principles, but who also can illustrate them with historical examples, giving facts concerning troops, commanders, weapons, supply, communications, terrain, and weather, can give life to his instruction and make it useful.

This is just as true in troop training as in formal instruction in military schools. Above all else, however, military history gives an interesting and deep insight into the minds and hearts of military men, into tactical and strategical methods, procedures, and principles, and into the relations between war, politics, economy, philosophy, geography, and the mentality of nations and races.

If military history is to be of greatest value in instruction and training, it must be more than a logical, factual record or account of events. After the facts have been synthesized into an effective record, there is a final step in the project —the analysis of the facts and the formulation of conclusions based on that analysis. This last step can be taken only by one who is both well grounded in historiography and professionally qualified to deal with the military organization and the operations recorded. In dealing with these subjects at the higher levels, the analyst must have a knowledge of national policy, of the higher organization for war, of military geography of strategy and grand tactics, of logistics and techniques of the combined arms, and of weapons. At the lower levels of military organization and operations, the analyst must have a knowledge of troop psychology, of weapons, of terrain, of weather and climate, and of tactics, logistics, and techniques of the combined arms.

Changes in Tactics and Techniques

One of the most important lessons a military student can learn from history is the necessity of quickly recognizing the changes in tactics and techniques which are indicated during the course of a war, and especially during the meeting engagement. It is at these times that secret weapons and differences in tactics and techniques show up most clearly and require immediate adjustment to conditions on the battlefield. History teaches that commanders must react quickly to the new conditions and, at the same time, transmit information to higher commanders concerning the circumstances and occurrences on the battlefield which indicate a need for changes in equipment, tactics, and techniques. The study of the initial phases of military operations deserves special attention. These are periods that mark the introduction of new weapons, new tactics, or inexperienced troops; that involve a sudden shift in type of terrain, in defensive arrangements, in weather, or in seasonal conditions. It is during these periods that faulty organization, inadequate or impractical training, inefficient weapons, failure of leadership and communications, inadequate logistical support, faulty co-ordination of the various arms, unforeseen effect of weather and terrain, rumors, and many other factors, some almost intangible, create a state of con-

fusion which should challenge every military student. Knowledge gained through a study of the initial phases of past operations will pay untold dividends to those who may be involved later in similar situations.

Learning From Experience

A military student should not allow personal experience on the battlefield to limit his point of view but should add to it the experiences of others. Conclusions and principles based on a single personal experience or an inadequate preparation in military history are very dangerous. Ardant du Picq, a profound student of combat, has expressed the matter in another way in his *Battle Studies*. In a questionnaire submitted to contemporaries he said,

Whoever has seen, turns to a method based on his knowledge, his personal experience as a soldier. But experience is long and life is short. The experiences of each cannot therefore be completed except by those of others.

In short, a careful study of objective military history with an open mind and with the determination of learning from the experiences of others will be of great benefit to any military student.

The principles of strategy have been evolved from an analytical study of many wars. They are based on a great many experiences of the past and are immutable. "Consequently," as General Douglas MacArthur has said, "the Army extends its analytical interest to the dust-buried accounts of wars long past as well as to those still reeking with the scent of battle," with the object of the search dictating the field for its pursuit.

In the field of tactics and techniques, doctrine based on personal experience or the experience of others is apt to lead to error, for, as General MacArthur has also said,

In every age these [tactics] are decisively influenced by the characteristics of weapons currently available and by the means at hand for maneuvering, supplying, and controlling combat forces.

Leadership, organization, communications, training, morale, terrain, weather and climatic conditions, and the enemy will also differ as well as many other things. Peacetime tactical doctrine, therefore, can be determined only by a process of reasoning, by studying experiences of others in the most recent wars, and by experimentation. When doctrine has been subjected to test in actual battle, it should be quickly readjusted to conform to reality and kept in step with conditions during the entire course of operations.

Learning From the Vanquished

Upon the conclusion of a war, the victors decide how they should organize and equip for the future. They base their conclusions on their own experiences, which, no matter how great, are limited. It might be said that the victors reorganize on the basis of considerable self-esteem, attributing their success to better organization, equipment, training and leadership, while the vanquished reorganize on the basis of considerable humility, analyzing events and determining and eliminating weaknesses with the intention of defeating the recent enemy. Military progress is, therefore, slow among the victors because conceit and complacency too often have the upper hand. The vanquished, however, looking further ahead, build new organization and new equipment.

This lesson should be carefully heeded by the United States: having won all the wars in which she has engaged she is in a certain degree of danger because history reveals that military victory has frequently contained the seeds of weakness, deficiencies in co-ordination, training, discipline and leadership, inefficiencies

in organization and logistical arrangements, inadequacies of intelligence, and shortcomings of equipment and supply. The most convincing lessons can be learned from defeats. However, it is infinitely better to learn from the defeats of others. It is, therefore, advantageous to study and analyze the records of the vanquished. The student of military history should give careful consideration to the writings of the leaders of defeated nations who have been allowed to express themselves unhampered by censorship. Frequently, much more can be learned from them than from the leaders of victorious nations who are apt to pass over the unfavorable matters and leave the impression that few mistakes were made. The veil of censorship usually continues in victorious nations where the proprieties are at least insisted upon and military regulations and discipline are at hand to enforce them.

Preparation for Higher Direction

The American Revolution was but the prelude to the era of peoples' wars, the wild and desperate struggles that have grown in intensity and destructiveness down to the present time. As Marshal Foch said in his *Principles of War:*

> . . . *they* [*the peoples*] *were to set themselves the goal, not a dynastic interest, not of the conquest or possession of a province, but the defense or the propagation of philosophical ideas in the first place, next of principles of independence, of unity, of immaterial advantages of various kinds. Lastly they staked upon the issue the interests and fortune of every individual private. Hence the rising of passions, that is elements of force, hitherto in the main unused.*

In the United States, the direction of the Armed Forces is vested in the civilian Chief of State or President and the policy matters in the Congress. The Executive and the Congress are elected to office and have not often been trained or soundly experienced in military affairs. The President must, of necessity, co-ordinate the vast executive agencies of the government in both peace and war. He must understand the various agencies, and the contributions they can make to the national security, as well as their requirements. He must also be capable of convincing the policy-making body or Congress of the necessity for these requirements. At the same time, he must be capable of decentralizing the execution of tasks to subordinates.

As General Maurice has pointed out, much of the difficulty in the relations between statesman and soldier has arisen in the past because of a misconception of what is meant by the conduct of war. Too many military men have thought of it as the direction of the armed forces in actual operations. Today, however, it implies the direction of the entire power and resources of the nation in pursuit of national objectives and their co-ordination with those of allies. This is certainly the responsibility of the highest ranking military commanders for they are intimately concerned in them because of their bearing upon the preparation and organization of the nation for war. On the civilian side, the statesmen are generally even less prepared for their role in a national emergency because the civilian educational system has long slighted the study of war. Those who have aspired to high government positions have had to prepare themselves on their own initiative.

The soundest preparation for an understanding of the delicate relationship of statesman and soldier and of their mutual problems in the conduct of military affairs in peace and war can be made by studying history—particularly American history of the periods preceding, during, and following national emergencies. Un-

fortunately, future statesmen are rarely sure of their place in sufficient time to make the necessary preparation. Personnel of the Armed Forces are in much better position to foresee their future roles in war than these unknown ones who will someday be their superiors. They should, therefore, conscientiously prepare themselves for the supporting roles of advisors to the paramount civilian authorities and of instructors to the American people. Both roles will require great moral courage if the public interests are to be best served. An improperly prepared individual or a base flatterer may rise to the position of chief advisor on the basis of personality and lead his superiors and the country to ruin. The bloody pages of history are replete with examples of this kind.

Today, every element of national strength—ideological, spiritual, psychological, political, financial, economic, technological, and military—is involved in war and in the preparation for war. Even worse, imperialistic communism has made conflict a continuing and continuous activity among the people in every land in the world. The very name *war* has become too restrictive. *Universal conflict* better describes the relations of man to man, of people to people, and of state to state in the shrunken world of the twentieth century.

Now, less than ever before, can responsible military leaders ignore the broad fields of knowledge involved in this concept of *universal conflict*. Accordingly, military leaders who are responsible for advice on strategy should be versed in the broader aspects of all of these matters and should bring to their task a balanced judgment capable of giving to each the correct value it deserves in solving the great problems that arise in a rapidly changing world.

Above everything else, however, American military leaders should have a knowledge of their own land and its people and of its military history. Without this fundamental knowledge, decisions might sooner or later transcend the practical and realistic. This could result in a national catastrophe.

Education of the American People

The military student can render an important service to the United States by making clear to the people and their representatives in Congress the basis, causes, and characteristics of war, the principles underlying the conduct of alliances, the co-ordination of domestic, foreign, and military policy, and the conditions governing the conduct of operations and the men who fight them. In doing so, as Burchardt has pointed out, the history of our country, threatened with the same pitfalls that have engulfed other nations in the past, should be considered in parallel with that of others and in relation to world history and its laws—a part of a greater whole. This will require not only an understanding of the histories of existing nations but of those, once powerful, but now gone forever. The importance of the subject and the profound lack of understanding of war by the people and their representatives, not entirely attributable to indifference, should spur the patriotic military man to undertake the unpopular and unprofitable role of instructor to the masses and to their political leaders.

The role of instructor to the people is, however, a difficult and thankless one. Many of the thinkers who attempted it have lacked objectivity and in their zeal have adopted propagandistic techniques.

And even the best have been accused of warmongering by their opponents when in fact the latter were themselves planting the seeds of war.

INFANTRY DIVISION ATTACK OF A FORTIFIED POSITION

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THE attack of a fortified position is a military operation which is usually costly in both men and equipment. For this reason, we strive to secure the capitulation of the forces garrisoning a fortified position by outflanking and isolating them or by laying siege to them. The maneuver of outflanking the position may take the form of a ground envelopment or a waterborne envelopment. In any case, whenever possible, the direct frontal assault is avoided.

Unfortunately, however, there will arise situations where an envelopment is either impossible or infeasible. This will be the case if the enemy has tied the flanks of his position into strong obstacles such as impassable mountains or unfordable bodies of water and we lack the necessary airborne or waterborne lift. It may also be the case if there is a requirement for the early destruction of the enemy forces which will not permit us the time required to execute an envelopment. It behooves us, therefore, to be familiar with the peculiar aspects of attacking a fortified position and the special techniques involved. The skillful application of these techniques will reduce the casualties and give greater assurance of success to any operation of this nature in which we become involved.

A fortified position usually consists of a group of key terrain features carefully organized to achieve depth and mutual support. On these terrain features will be constructed forts (either surface or underground), bunkers, trenches, pillboxes, and obstacles such as antitank ditches, road blocks, dragon's teeth, barbed wire, gassed areas, and mine fields. The composition, extent, and utilization of the fortified position will depend on such factors as the enemy's strategic aims, his tactical doctrine, his resources (manpower and matériel), and the operations already conducted in the war.

General Karl von Clausewitz, writing in his book *On War*, stated that "The effectiveness of a fortress is plainly composed of two different elements, the passive and the active." The passive element mentioned by Clausewitz is supplied by the works or fortifications themselves; the active element is furnished in the form of the personnel who man these fortifications or who work in conjunction with them. In recent wars we have seen a number of combinations of these two elements. In ap-

The attack of a fortified position is usually costly in men and equipment. To achieve greater success in an operation of this nature, we must learn the skillful application of the special techniques involved

proaching the problem of how to attack fortified positions, we should first become familiar with the various combinations we may encounter.

Following World War I, many of the outstanding military leaders, particularly in the French Army, came to the conclusion that the principal role of armies of the future would be to defend the homeland against the incursions of any aggressor. To assist them in the accomplishment of this mission, nations built vast, elaborate systems of permanent fortifications. The Maginot Line in France, the Mannerheim Line in Finland, and the fortified frontier of Czechoslovakia were typical examples of this school of thought.

In the concept of the Maginot Line, we find the passive element playing the predominant part. The active element, the personnel, was merely to man the armament and to execute small, local counterattacks. The structures and works that composed this line were built of reinforced concrete and steel. Sleeping quarters, storerooms, and command posts were all well underground where they were protected from bombing and shelling. Above the surface were pillboxes and enclosed gun emplacements of reinforced concrete. Weapons in these shelters covered barbed wire, mine fields, and antitank obstacles that lay around and between the works.

Reduction of a system of fortifications such as these could be accomplished only by a slow, step-by-step destruction of the individual emplacements. If, however, the attacker chose to by-pass the static defenses, as did the Germans in 1940, the relatively immobile part played by the active element would greatly enhance the attacker's chance of success. Superior strategy, rather than superior tactics, was the solution to neutralizing this type of line.

A future enemy may use an extensive series of underground forts such as those we have just seen. On the other hand, he may choose a system similar to the German West Wall where he will utilize a series of concrete and steel pillboxes and emplacements located to cover likely avenues of approach and protected by such obstacles as antitank ditches, dragon's teeth, barbed wire, and mine fields.

In the concept of the defense of the Siegfried Line, the active element—the counterattacking armies—was to play the principal part. As it turned out, the previous battles in Russia, North Africa, and Normandy so weakened the German forces, that the active element played little part in the actual defense operations.

Again, the enemy may place his principal reliance on the natural strength of the terrain and reinforce it with trenches, caves, underground shelters, barbed wire, mine fields, and tank traps. This system was employed by the Japanese in their defense of various islands of the Pacific and in the mountains of the Philippines. Similar types of fortifications were used by the Chinese and North Korean Communists in Korea.

The Japanese combined earth, logs, and excellent skill in camouflage to build machine-gun emplacements that would withstand all but very heavy gunfire and were almost impossible to distinguish either from the ground or the air.

How will the enemy utilize works of the types discussed? As was mentioned before, he will dispose them in width and

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depth astride the likely avenues of approach. They will be used to reinforce the natural obstacles along the front. The depth of his position will vary, with the greatest depth being where the least defensible terrain, from a natural point of view, exists. In some places the depth may be as little as 2,000 yards, while in others there may be a series of fortified belts 2,000 to 4,000 yards in depth, located from 10,000 to 15,000 yards apart. In addition to the forces which man these works, the enemy will retain large mobile reserves strong in armor and fire power.

Planning the Operation

Obviously, the planning for the rupturing of this type of position must be very detailed—much more detailed than the planning for the attack of a typical organized position. Furthermore, such planning must begin early in order that the necessary troops and supplies will be ready.

Normally, the operation will be broken down into four phases.

1. Reduction of outpost—uncovering main battle position.

2. Breaching main battle position.

3. Widening gap created.

4. Completing encirclement and isolation of remaining fortifications.

Some of these phases may overlap—particularly on weaker parts of the front. Where the enemy is particularly strong and prepared for our attack, we should strive to have phase 1 accomplished by troops other than those to be employed in the main effort in phase 2. This permits maximum preparation by the assault troops, greater concentration at breakthrough point, and allows us to strike the main position with fresh troops.

Objectives designated for seizure by attacking units must be carefully selected. The initial objectives must ensure the breaching of the position. Subsequent objectives will be terrain which will enable our attacking units to hold back the shoulders of the gap created and permit additional forces to move deeper into the enemy position. These forces will, in turn, seize objectives from which armored and motorized reserves can be launched to exploit the breakthrough and seize objectives deep in the enemy rear.

When attacking a fortified position, the maximum concentration of force is placed opposite the desired breakthrough point. To assist in achieving this concentration, the zones assigned to the main effort are considerably narrower than would be employed in attacking a position that lacked strong fortifications. During World War II, infantry divisions attacking the Siegfried Line were frequently given frontages of from 2,000 to 3,000 yards.

The question now arises as to the suitability of the infantry division as presently organized for attacking a fortified position. Does it have the fire power and equipment needed? Does it have sufficient flexibility? Should we employ special type divisions for operations of this nature?

Early in World War II, a study was made to determine the advisability of creating special type units for assaulting fortified positions such as the Siegfried Line. Based on this study, a recommendation was made that special assault battalions be organized and allotted on the basis of one for each corps. This recommendation was not approved and subsequent operations bore out the wisdom of this decision. Infantry divisions conducted successful assaults against all types of fortified positions in Europe and the Pacific. More recently, they have successfully breached strongly fortified positions in Korea.

Although there is no requirement for changing the infantry division for such an attack, there is a need for increasing its ability to handle this type of operation.

This is accomplished by issuing special types of equipment such as flame throwers and demolitions to the infantry and engineer elements. Additional units, such as artillery, engineers, chemical, and tanks are attached to or placed in support of the division. Available air support should be employed to support the division making the main effort. Last, the division itself should be given intensive specialized training in the techniques of reducing fortifications.

Let us consider the various tasks which must be accomplished prior to our actual attack.

Our first requirement will be for complete and detailed information regarding the enemy fortifications, the forces available to man these works, and the doctrine of employment of both elements. Intelligence and reconnaissance must be continuous during the planning phase. No information can be overlooked. Success will depend upon the thoroughness and completeness of our picture of the enemy situation. Only by learning exactly what faces us can we be assured that our plans provide for meeting all the contingencies that may arise in carrying our attack to a successful conclusion.

What then must we learn about the enemy?

First, we must learn the extent and depth of the enemy fortified line and complete details on the terrain and weather. Next, we must know what forces are available to the enemy. This should include information on the types and numbers of units, their state of combat efficiency, their morale, their status of supply, and their location. Particular attention is paid to reserves, especially armored reserves and the doctrine of their employment.

The items we have mentioned are, of course, required for any attack. In addition, when attacking a fortified position, we need a vast quantity of engineer intelligence. Included under this heading will be details concerning:

1. Locations of all fortifications.
2. Nature and locations of all obstacles.
3. Nature of fortifications to include number and positions of embrasures, thickness of concrete, wood, steel or earth protection, entrances and exits, underground organization, number of men in each work or shelter, security measures, warning devices, and camouflage.
4. Location, type, and fields of fire of all weapons.
5. Command and communication facilities.
6. Defiladed approaches.

Additionally, we will want to know what positions are available for placing our direct fire weapons and the availability of covered and concealed assembly areas and attack positions.

Sources of information will be enemy military personnel (alive or dead), enemy documents, communications intercepts, civilians (refugees, displaced persons, local inhabitants, construction personnel), escapees, evadees, aerial photos, visual reconnaissance (ground and air), maps, climate studies, weather forecasts, and special studies (theater, headquarters, and Department of the Army).

Information from all of these sources will be collected, sifted, and evaluated. Under the direction of G2, all units, particularly the assault units, will be supplied with the latest detailed data. Annotated large-scale photos, low-level obliques, ground photos, sketches, overlays and overprinted maps showing exact location and appearance of pillboxes, emplacements, and obstacles as seen from all angles, will be prepared and issued to the lowest units. Terrain reliefs and sand tables, which will show the attacking troops the fortifications, obstacles, and all aspects of the terrain, will be built. Actual size models of the various emplacements and obstacles to be encountered will be constructed based

on the information available. In the breaching of the Siegfried Line during World War II, the G2 of the XIX Corps provided intelligence as complete and detailed as that available for the Normandy Invasion. The locations of 90 percent of the pillboxes were plotted on 1:25,000 maps and 1:11,000 photomaps, and sheets were given to each squad showing the details of the area in which it would operate.

Work to collect and disseminate this information must begin early and continue throughout the operation.

G2's work is not confined just to the collecting, processing of information, and disseminating of intelligence. A very important part of his task will be counterintelligence. The success of our attack may well depend upon the surprise we can achieve. It will be almost impossible to deny the enemy knowledge that we plan to attack. However, by the exercise of the proper security measures, we may prevent him from learning *where* and *when* we plan to make our main effort. If this can be withheld from him, his ability to react and shift his forces to block us may be so delayed that he will be unable effectively to stop our attack.

Active and passive counterintelligence measures should be employed. Counterreconnaissance must prevent the enemy patrols from getting into our lines. Our own patrolling should be planned so as not to indicate by its scale in any one area that we are focusing our attention on this spot. Reserves should be shifted occasionally during the preparation phase to keep the enemy off balance. Assembly and training areas should be carefully guarded. Roads and trails built to permit forward movement of assault units, supply build-up areas, attack positions, and direct-fire weapons positions should be camouflaged or covered to prevent disclosure to the enemy. Security must be strictly enforced. Smoke may be employed to limit ground and air observation along the front. Nothing which can be done to conceal our intentions should be overlooked.

Based on the mission assigned by corps and the information supplied by G2, the G3 must prepare the plan for the attack. Let us turn now to a consideration of how we, as G3s, would plan for the attack of the Aggressor fortified line shown in the fortified position on page 33.

In assigning the mission to the division, the corps commander must consider the strength and depth of the enemy fortified position. If the enemy fortifications are laid out in a series of belts as shown in the sketch, days of slow, deliberate fighting may be required to break through to a point where any exploiting force can be launched. The division making the corps main effort initially, may continue to drive through the full depth of the enemy fortified zone, or it may be passed through by a fresh division after it has ruptured the first or second belt. If our division, in this case, is to go through all three belts, the G3 must plan accordingly. Such being the case, at what point can we expect we will reach phase 4? Will it be when we have gotten through the first belt, or when we have gotten through the third belt, or some intermediate point? The answer is —we must consider the attack of each belt as a separate operation. Phasing and objectives will be set up accordingly. When the penetration of the first belt is complete, the division will move rapidly to attack the next belt. Depending on the speed of the attack and the enemy reaction, we may reach the second belt and be able to move through it before the enemy has a chance to occupy it in strength and set up a continuous defense. If we fail, the attack will follow the same pattern as that on the first belt.

The availability of helicopters or trans-

port aircraft may permit the landing or dropping of troops close in to strike the enemy from the rear and assist the penetrating forces. These troops would be employed under army control, but would undoubtedly be attached to the infantry division on link up.

Let us assume the corps order directed that the 20th Infantry Division breach the enemy line in the zone as indicated. When the penetration is complete, the 23d Armored Division will pass through to exploit. It is hoped it can reach and break through the second belt before the enemy can reorganize and occupy it in strength. Seizure of Hill 666 is given as the division objective. G3 now must select intermediate objectives. Analysis of the terrain and the enemy situation indicates that seizure of objectives 1 and 2 will ensure a breach of the enemy fortified position. Objectives 3 and 4 will provide us with positions that will enlarge the gap and protect the flanks of forces moving through the penetration area. Objective 5 will give us command of ground overlooking the road net and the enemy rear area. From this point corps can launch its reserve, the 23d Armored Division, to exploit. Selection of these objectives is based on the same considerations as are involved in any penetration. Based on these objectives, zones of action are assigned. As previously mentioned, these zones will be narrower than usual to permit the assaulting units to be disposed in depth. Here, we employ two regiments abreast with the 58th Infantry Regiment having the narrower zone in which to make the main effort. The 60th Infantry Regiment, as the reserve, is ready to pass through to seize the final objective.

Organization for Combat

Our next problem is how to organize the division and attached units for combat. Let us assume that the corps commander attached one battalion of 105-mm self-propelled howitzers, a 4.5-inch rocket battalion, one battalion of 155-mm self-propelled guns, one battalion of antiaircraft artillery automatic weapons, one battalion of infantry mortars, and one battalion of 120-mm gun tanks to the division. The 120-mm gun tank battalion has attached to it a company of flame-throwing tanks. In addition, two of the corps field artillery groups, containing medium and heavy artillery, were directed to reinforce the fires of the 20th Division Artillery. An engineer combat group was placed in support of the division. One chemical smoke generating company, given to the corps by the army, will be in general support of the divisions of the corps.

To each assault infantry regiment we will attach a company of the 120-mm gun tanks, a battery of antiaircraft artillery, and a company of engineers. The 58th Infantry Regiment will have attached to it two platoons of flame-throwing tanks; the 59th Regiment will have one.

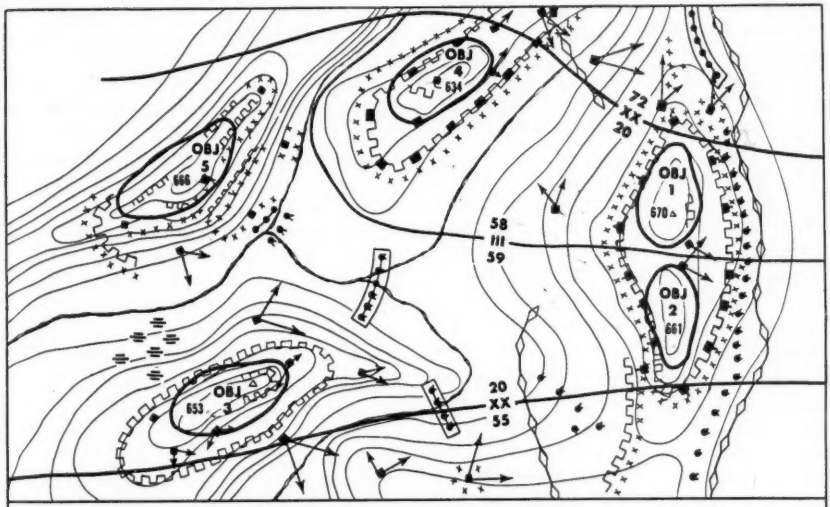
Division reserve will consist of the 60th Infantry Regiment, 20th Tank Battalion, the attached 120-mm gun tank battalion (less 2 companies), and the company of flame-throwing tanks (less 3 platoons).

Each regiment will have its normal artillery battalion in direct support. The 58th Infantry, making the main effort, will have the fires of the 105-mm self-propelled battalions, the Infantry Heavy Mortar Battalion, and the 80th Field Artillery Battalion to reinforce the fires of the direct support 77th Field Artillery Battalion. The rocket battalion will be in general support.

One battery of 155-mm self-propelled guns will be attached to the 77th Field Artillery Battalion and one to the 78th Field Artillery Battalion. The battalion, minus these two batteries, will be in general support with the remaining battery

prepared for attachment to the 79th Field Artillery Battalion when the 60th Infantry is committed.

An antiaircraft battalion group will be formed by attaching the corps battalion to the 20th Antiaircraft Artillery Battalion (Automatic Weapons). This battalion group will protect the division artillery, division reserve, and critical points in the division rear area.



SKETCH OF AN AGGRESSOR FORTIFIED POSITION

It may appear there was little out of the ordinary in the organization for combat just given. While it is true that many of these attachments are fairly routine, in an operation of this nature we decentralize the bulk of the engineers, 120-mm gun tanks, and part of the antiaircraft. This is done to permit closer integration and control of the assault elements at the lower echelons. Another distinctive point is the employment of the 155-mm self-propelled guns. Normally, these weapons would be held under battalion control in general support of the division.

The important factors to remember in organizing artillery for combat are that:

The bulk of the artillery is retained under centralized control to ensure adequate coverage of targets. Organization for combat should be flexible enough to permit change at any time.

As previously mentioned, the division making the main effort should be withdrawn from action, if possible, and be given an opportunity to train before the assault of the main enemy position begins. If circumstances do not permit the withdrawal of the entire division, the units to make the assault should be rotated into reserve for a sufficient time to permit specialized training.

The importance of specialized training cannot be overemphasized. The reduction of fortified works calls for highly developed teamwork on the part of all concerned. This calls for intensive training all the way down to squad tactics. Closely knit teams of infantry, engineers, and tanks are formed and trained to work

together. For this reason, attachments to be in effect for the attack should be made at the time training begins.

Training for the attack may be said to be divided into technical training and rehearsals. Training should cover the use of demolitions, flame throwers, bazookas, and should include the co-ordination of assault detachments, practice firing of all weapons, and practice runs in the destroying of pillboxes. If a river crossing is to be made in the attack, practice crossings should be made over a river barrier comparable to the one which will actually be encountered.

If time permits, a sand table can be constructed by each battalion showing in detail the location of the pillboxes, rivers (if any), wire, roads, ridges, draws, houses, and trees. As each reconnaissance mission or patrol brings in additional information, changes can be made to conform with what has been observed. Companies can be assigned their areas, platoon leaders can be shown which pillboxes they are to reduce, squad leaders can be given their missions and, if possible, each man in the assault detachments can be permitted to see the sand table and have his role in the attack explained to him.

The men should also be prepared psychologically. They must be confident and know that the fortified position is not impregnable and that they must exercise great speed in their assault.

A large portion of the training should be conducted under conditions of limited visibility in order to develop proficiency in operating in darkness, fog, or smoke.

While the assault elements are completing their training for the attack, the fire support agencies will be engaged in setting the stage.

Looking first at the air support, we find that FM 100-5, *Field Service Regulations, Operations,* states "Air superiority is necessary in operations against a fortified position." While we can cite the limited objective attacks of the North Korean and Chinese Communists against our fortifications in Korea as an example of assaults making gains without air superiority, the limited success and the terrific casualties they suffered show the unsoundness of such operations.

The supporting air effort, therefore, will be committed to:

1. Maintaining air superiority.
2. Isolating the battlefield by attacking supplies and reinforcements moving toward the breakthrough area and sealing off the roads and trails into the area.
3. Bombing and strafing: enemy artillery, reserve assembly areas, supply dumps, and command installations.

Since saturation bombing may require the diversion of a large portion of the strategic air effort, this decision will be made at the highest echelon and then only if the results will have a decisive influence on not just the battle, but the entire war.

Experiences, such as St Lo in World War II and with *B-29s* in Korea, have failed to establish this as a desirable use of air support.

On the other hand, tactical aircraft using rockets, delayed action, armor piercing bombs, napalm, and machine-gun fire can be of great assistance in softening up the enemy position. Also, the craters made by the bombs will provide cover for the assault elements. During the assault phase they attack enemy reserves and provide close support. Visual and photo reconnaissance are conducted continuously. Particular attention is paid to low level oblique photos of the enemy fortifications.

In planning the fires for the supporting weapons, we must analyze the various enemy fortifications and locations. Based on this we determine what type and quantity of fires will be required to destroy or neutralize the targets. Plans are then

made for continuous fire support. The artillery fires will be laid out as follows:

1. Fires prior to the preparation.
2. Preparation.
3. Close support fires.
4. Fires to break up enemy counterattacks and protect reorganizations.

Depending on the length of time available, the amount and type of ammunition, and the amount of artillery, fires prior to the preparation may last for several hours or several days. The density of the fires will be greater than for the normal attack. The mass of the artillery will be well forward. During this period the artillery will be employed along the entire corps front in order not to reveal the exact point of breakthrough.

During these fires the tanks and direct support self-propelled artillery will be moved into camouflaged position but will not fire. Smoke or darkness will be used to screen these movements.

The decision on the use and extent of preparation will depend on the:

1. Strength of hostile positions.
2. Time required for enemy to relocate reserves.
3. Effect of surprise.
4. Extent to which participation of air support reduces need for preparation.
5. Ammunition and weapons available.

Normally, a preparation will be fired employing all available corps artillery and all but the direct-fire division artillery. This preparation will be used to stun and disrupt the enemy. All known or suspected emplacements, observation posts, command posts, artillery, and reserves capable of affecting the area of penetration will be attacked.

At the termination of the preparation, the artillery will be diverted to flak suppression, while fighter-bombers come in to attack targets the artillery has been unable to reach.

As the assault begins, the bulk of the corps artillery will shift to counterbattery, interdiction, attack of positions farther to the rear and flanks, and disruption of movements of reserves into the area of penetration. Division and attached artillery will provide close support fires to keep down enemy fires on assault elements, fires to cover reorganizations, and smoke to neutralize enemy observation. Organic and attached mortars will thicken these fires. Antiaircraft artillery automatic weapons are also employed in direct and indirect fire roles.

A word might be said here as to the effectiveness of the fires of different type weapons on concrete type structures. They can be broken down generally into two categories: those suitable for destruction of pillboxes and bunkers, and those suitable for neutralizing firing embrasures.

All small arms (to include 50 caliber machine guns), mortars, rocket launchers, and recoilless rifles (except the 105-mm) are capable of doing only negligible damage to concrete structures. They are used primarily to neutralize the embrasures.

The 105-mm recoilless rifles, 90-mm and 120-mm tank guns, 155-mm howitzers and guns, 8-inch howitzers and 240-mm howitzers are all excellent destructive weapons. The 105-mm howitzer, unless used in a direct fire role, is only a fair destructive weapon. It is better employed to dislodge camouflage or to hit the entrenchments.

As the preparatory fires lift, the assault is begun. The infantry-engineer-tank teams move out. The fires of all direct-fire weapons are concentrated on keeping the embrasures closed up and eliminating direct fires on the assault elements. The engineers, attached to the assault teams, using bangalore torpedoes will blow gaps in the antitank and antipersonnel mine fields and obstacles, breach the barbed wire, and assist in destroying or neutralizing pillboxes and em-

placements. Tanks with dozer blades will cover up the antitank ditches and clear paths through the obstacles. Others, with flails, will assist in breaching the mine field.

As each team reaches the pillbox or emplacement which it has been designated to reduce, the following procedure is employed. The fire support group employing bazookas, recoilless rifles, machine guns, and flame throwers will concentrate their fires on the embrasures to prevent enemy fires on the assault group. Tanks moving along with the infantry will also assist by direct fire and flame throwing. The mortar and artillery fires are placed on enemy positions to the rear and flanks. The assault group maneuvers to close on the emplacement. Once they are within striking distance, the fires are lifted and the demolition team dashes forward and places its charge. Infantry, which has been specially trained, will perform this operation.

As soon as the charge is blown, the assault team moves to its next objective leaving only the personnel necessary to make certain the enemy resistance has been eliminated.

Pillboxes and emplacements, the positions or effectiveness of which will not interrupt the advance of the assault forces, are by-passed and left for the follow-up forces to eliminate.

This may be done by demolitions or covering up the pillboxes and emplacements with bulldozers. In any case, they should not be left for possible reoccupation by the enemy.

As the attack progresses, successive elements are pushed forward. When a unit captures its objective, it quickly reorganizes, prepares to resist counterattacks, and assists the forward movement of the follow-up forces.

We have covered the role of the engineers with the assault elements. The remaining engineers will be employed in:

1. Clearing roads and passages for follow-up forces.

2. Resupplying assault teams with demolitions and equipment.

3. Rebuilding bridges or constructing fords.

4. Providing engineer support for remainder of the division.

Pressure on the enemy is not relaxed throughout the whole of the operation. As each successive objective is taken, the forces reorganize and push on or are passed through by follow-up troops. Speed is essential.

Once the final objective is secured, the armored division will pass through to move against the next line and seize the corps objective. The infantry division will continue to hold open the gap, mop up the remaining resistance, and prepare to follow and support the armored division if so directed.

Co-ordination and Communication

The success of an attack of a fortified position is dependent, to a considerable degree, upon the co-ordination of the operations of the various participating elements. Initial co-ordination is obtained principally through prior planning and the dissemination of these plans in the form of orders.

These orders would be prepared and disseminated well in advance of the actual attack.

Initial co-ordination, of course, is not enough; co-ordination must be continuous, and must be exercised throughout the operation.

Consequently, a reliable signal system must be operating during all phases of the operation—that is, during the planning and attack phases.

To obtain reliability, multiple means of communication must be provided. It is well to keep in mind that during an

operation such as this, we must expect temporary failures on communication equipment.

We know that once the enemy learns of our attack, he is going to lay down a heavy barrage of fire on our positions. Whether he is actually attempting to disrupt our wire system or obtain what we might term lucky hits, he is apt to cause temporary failure. By having alternate routes we could, to a great extent, overcome the difficulty of the effect of the enemy artillery fire on our wire lines. We can expect some damage because of the concentration of our troops.

To prevent this we will plan to take all of the physical precautions possible, such as digging in our installations, placing wire overhead, and attaching small wire teams to the various attached and supporting units. The protection and care of our wire system by all troops, infantry, artillery, engineer, or others, should be emphasized during training periods. Dependence on radio cannot be counted upon during the attack. This may be caused by the noises of battle or by enemy jamming. Since he will have a dependable wire system set up, the enemy will be free to employ every possible measure to disrupt radio transmission.

We can expect high casualties in our messengers, particularly in our forward elements. If not planned for, this factor could have an adverse effect on the operation.

Equipment can present a problem. Additional wire would be needed as well as switchboards, telephones, and wire reels. The success of the wire communication system may depend, to a considerable degree, upon the amount of extra equipment available.

While G2 and G3 have been busy in their fields of interest, the other general staff officers will be making their preparation based on the plan of attack.

G1 Problems

Two of the most important tasks facing G1 will be the provision of replacements and the handling of prisoners of war.

If we study the experience factors on loss estimates, we find that casualties from an attack of a fortified position far exceed those from any other type infantry division operation. Battle losses will be almost double those suffered in the attack of a normal field position.

This means that G1 must plan in advance to have adequate trained replacements available in order that the division will not become so depleted it becomes ineffective. It will also place a heavy burden on the medical facilities which the surgeon must be prepared to meet.

In the initial stages of the attack the number of prisoners will not be too great, but as more of the enemy fortifications are neutralized and isolated, we can expect the surrenders of individuals and groups to increase. These men must be moved from the fortified area without delay. Combat troops must not be detained from their mission of pushing the attack by the necessity of guarding or evacuating these prisoners. G1 must ensure that provisions are made for taking over the prisoners of war early and their rapid evacuation by the army from the division sector.

G4 Problems

The attack of a fortified position will impose an increased burden on G4 to coordinate supply, evacuation, and maintenance.

Prior to the attack, there will be a requirement for building up supply levels, particularly of Class IV. In addition, since tremendous quantities of ammunition will be expended and in a relatively short period, ammunition in excess of prescribed loads may be authorized. G4 must make every effort to ensure that well

stocked ammunition supply points are located well forward to facilitate resupply. If the over-all availability of ammunition permits, it is desirable to keep basic loads intact to facilitate displacement in close support of operations.

Of special importance will be armor-piercing ammunition, bangalore torpedoes, rockets, and grenades. Large quantities of hand-placed explosives, such as satchel, beehive, and pole charges will be required, as well as smoke and incendiary shells. Flame throwers must be secured together with an adequate supply of thickened fuel. Division supply installations should be located well forward. Care must be exercised, however, to locate supply installations beyond enemy medium artillery range whenever possible. In all events, however, maximum use must be made of concealment, dispersion, defilade, camouflage, and protection by revetment, to prevent destruction of essential supplies by the enemy in his counterpreparation fire.

Army supply installations should also be located well forward in positions from which they can support closely both the initial penetration and the exploitation of the breakthrough when it occurs.

Medical Facilities

Attacks of fortified positions are frequently costly in men as well as matériel. Based upon a specific estimate of casualties to be incurred, additional medical or surgical reinforcement for divisions may be necessary. Close support by army medical installations also is required. Care must be exercised to prevent the premature disclosure of medical installations, even though they are protected by the Geneva Convention. The location of an abnormally large number of medical installations on a narrow frontage may indicate to the enemy the main effort of the impending attack.

Traffic Control

Traffic circulation and control will present difficult problems during this type of operation. The narrow frontage normally utilized in the attack of a fortified position usually serves to restrict the road net available to the division. Because of the additional attachments to the division, there will be many additional vehicles operating within the division sector. A simple, sound traffic circulation plan is, therefore, most essential. Traffic control agencies must be alert and vigorous in their actions. Likewise, a high degree of traffic discipline on the part of individual drivers must be required.

Prior to and during the initial phases of the attack, it usually will be desirable to exercise centralized division control over unit field trains, with bivouacs selected beyond enemy medium artillery range. This serves both to eliminate unnecessary congestion in the forward areas, and also to reduce the matériel losses which otherwise must be expected during the firing of the enemy counterpreparation.

When the breakthrough comes, initial exploitation normally will be by armored elements, closely supported by motorized infantry. Detailed co-ordination will be required to provide for prompt, effective passage of the armored elements through the attacking infantry division at the propitious moment. Routes, times, and other troop movement data normally are co-ordinated directly between the infantry division and the armored elements concerned.

Transportation

The infantry division G4 also must have a plan for making trucks available for motorizing foot elements to support the armored elements in their exploitation of the breakthrough. Such a plan must be worked out in detail well in advance, must be kept current in the changing situation

of the initial assault and penetration, and also must be coordinated with the resupply transportation requirements of the division. Initially, during the tactical phase of a breakthrough, an infantry division normally must rely upon its own resources for transportation to motorize its foot elements. However, if it appears that a breakthrough is developing, corps or army usually will supply additional transportation to the division for this purpose.

During the planning, training, and rehearsal phase of an attack of a fortified position, every effort must be made to bring all division equipment up to maximum serviceability. Maintenance must receive additional emphasis during this period.

Special Considerations

With the attachment of additional units to the division, plus the authorization of special types of equipment and additional allowances of authorized equipment, the maintenance capabilities of the organic division service elements must be reviewed to determine whether or not the increased maintenance load can be carried during the attack. In all events, close maintenance support by army service elements is indispensable.

The commander's estimate of the situation must give due consideration to the logistical problems in an attack of a fortified position. The estimate of the logistical situation will have more widespread implications on an army level, however, than on a division level. For the purpose of such a logistical estimate, the initial assault, the penetration, the breakthrough, and the exploitation normally are considered as a single operation, merely divided into phases. Adequate logistical support for the entire operation must be assured before D-day and H-hour can be set. We have considered here the techniques involved in the attacking of a fortified position organized and laid out according to Aggressor doctrine. The principles and fundamentals will apply regardless of the type of position or the defensive doctrine. However, certain techniques may be changed. These changes may be expected in such things as depth of objectives, width of front, organization for combat, amount and type of preparation, and training required for assault troops.

Atomic Warfare

In considering this problem, we have made no mention of the impact of atomic warfare. If both sides have an atomic capability, will this call for changes in principles or fundamentals?

Careful study indicates the answer is "No." Certainly our techniques will be affected. The devastating power of the weapon will replace, to a great degree, the requirement for a preliminary softening up bombardment. This will mean we can employ the bulk of our artillery and air support at other points along the front. Greater surprise can be effected since, without the long artillery preparation, our attack made on the heels of the atomic explosion will strike the enemy before he can react. With most of the enemy fortifications, except those along the immediate front, neutralized or destroyed, the infantry assault forces will not have too great a depth to reduce. Thus, we will be able to launch our exploiting forces early or may even lead off with them.

On the other hand, the enemy capability of using atomic weapons against our forces will not permit the concentration of forces previously possible. Artillery will be more dispersed and dug in, as will be the direct-fire weapons. Forces, other than those used in the initial assault, will be dispersed in widely separated assembly areas from which they will have to move rapidly to close with the enemy. This will require careful planning and scheduling and reliable communications to prevent massing

enough forces at any point to present a lucrative target to the enemy.

Summary

We can summarize by considering the application of the principles of war to the attack of a fortified position.

1. *Objective.*—All efforts are directed to an objective deep in the enemy position from which strong mobile forces can be launched to exploit the penetration.

2. *Simplicity.*—Plans are detailed and complete, but simple in their concept. The simplest form of maneuver, the penetration, is employed to breach the line.

3. *Unity of command.*—All elements are grouped under the division commander in area of breakthrough.

4. *Offensive.*—Employed to the ultimate to isolate enemy resistance and destroy it.

5. *Maneuver.*—Illustrated by the operations of the assault, follow-up, and exploitation groups.

6. *Mass.*—Achieved by putting forces in depth on a narrow front and heavily weighting support.

7. *Economy of force.*—Achieved by using only limited means against other portions of line to contain enemy forces.

8. *Surprise.*—Achieved by not revealing until last minute the exact spot of attack.

9. *Security.*—Achieved by counterintelligence measures during preparatory stages and by use of follow-up forces and reserves during course of attack.

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DEVELOPMENT OF FIELD WATER SUPPLY EQUIPMENT

Harry N. Lowe, Jr., Chief, Sanitary Engineering Branch
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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

TO EVALUATE the water supply research and development program within the Department of the Army, it is necessary to consider the definition and scope of the task to be performed and to review the assignment of responsibility for the accomplishment of that task. Under the provisions of existing Army Regulations, the Corps of Engineers is charged with the responsibility for the accomplishment of the water supply mission in a theater of operations. Stated simply, the mission is to provide adequate quantities of water to support field operations under all conditions of climate, terrain, tactical maneuver, and enemy action—at any time or place on the earth's surface and with minimum expenditure of manpower and matériel.

As a result of interservice arrangements, the Corps of Engineers' water supply mission includes the field requirements of the Department of the Air Force. The Chief of Engineers is authorized to initiate and conduct research and development, to procure, store and maintain stocks of supplies and equipment, to organize and train personnel, and to otherwise acquire the capabilities to carry out the assigned duties.

Responsibility for staff control of research and development has been assigned to the Engineer Research and Development Division, Office of the Chief of Engineers. Technical control and conduct of the water supply research and development program is the responsibility of the Engineer Research and Development Laboratories at Fort Belvoir.

This organization and assignment of responsibility has had an important bearing upon the success of the water supply program.

Long-range planning and the establishment of goals are in the hands of those having authority for administrative review of the recommendations resulting from research and development. At the same time, responsibility for the accomplishment of research and development is associated with the necessary authority to establish the technical approach, conduct necessary work, and evaluate the results obtained. This arrangement not only prevents overlapping of authority and administrative confusion, but it also ensures maximum continuity, organization, and economy in programs and developments.

In no other field of military activity is there greater opportunity for interservice and interagency co-operation, advancement, and joint participation than in water supply research and development

A Military Problem

The experience of two world wars and the recent Korean conflict has dramatically demonstrated that the problems of military water supply are significantly different from civilian water supply problems in this or any other country. It is not possible to solve the over-all military water supply problem by simply adapting civilian waterworks knowledge and practice to the task. This fact governs much of the work now in progress and dictates the interrelations of the laboratories, research groups, and industry in support of the program. Since military water supply is basically a military engineering task, it follows that the technical leadership and guidance must come from within the military establishment where necessary specialists can devote required time and energy to the problem. The magnitude and scope of the task exceeds the capabilities of any conceivable group, however, and it is apparent that teamwork is the ultimate answer. In the Corps of Engineers, the laboratories act as both captain and quarterback. Consistent with its assigned technical responsibilities, the laboratories must call the play. To round out this backfield, there must be the research support of our colleges, universities, and independent laboratories; and the production engineering assistance of industry. This balanced team has already demonstrated its ability to function efficiently in the years since World War II.

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Interservice Co-operation

In no other field of military activity is there greater opportunity for interservice co-operation and joint participation than in water supply research and development. The same standards of quantity and quality must be met and the essential military characteristics of equipment and methods have wide application. Since World War II, much progress has been made toward closer co-operation between the services. Further progress may be possible. The Corps of Engineers is acutely aware of the necessity for economy in the conduct of assigned work and is prepared to support any and all interservice and interagency arrangements that result in reducing the cost of accomplishing desired results.

Every war produces its crop of armchair tacticians who feel that postwar developments should be devoted to improving the costumes and the props for the second show. The laboratories are cognizant of the mistakes of the past that require early correction, and significant progress to this end has been made. However, the current research and development program is expected also to provide solutions to those problems that now show but as shadows along the pathway to tomorrow. Many such problems are, of necessity, classified for reasons of security. It is necessary at times, therefore, that limits be established on the release of information and upon the number of civilian groups solicited for assistance.

A matter of interest to some is the position of the Corps with respect to significant developments resulting from water supply research and development at and by the laboratories. A small number of such developments are applicable only to the military problem, and are frequently classified for security reasons and may never be released for public review. Many other developments are applicable to the civilian waterworks field

and are of interest to engineers and industry alike. In most cases, developments of this type are revealed through scientific papers and thus become unpatented contributions to the public knowledge. The motivating consideration in these cases is that such developments result from use of the tax dollar and, therefore, the public at large should benefit. The procedures followed conform in all cases with applicable directives, but primary consideration is given to the release of information under conditions equally favorable to all those who may need or benefit from it.

Respect for patents and trade secrets is frequently a matter of interest to participants in the Corps of Engineers' water supply program. I do not propose at this time to engage in a discussion of the laws and regulations concerning patent rights and other related matters. It is sufficient to point out that there are no areas of incompatability between the laws of the land and the administration of research and development contracts by the Corps of Engineers. Generally speaking, the Corps is interested in knowing what components of items supplied are covered by prior patents and in obtaining royalty-free use of those patents resulting from developments under research and development contracts. Nowhere are trade secrets better protected and respected than at the Engineer Research and Development Laboratories. The same safeguards are provided as are used to protect security information.

New Inventions

No discussion of general policies would be complete without reference to new inventions and processes developed by individuals or commercial interests and offered to the Corps of Engineers for test or use. The Corps is always alert and receptive to new discoveries and developments and it operates a testing laboratory for its use only. The Corps must, of necessity, reserve the right to accept or to decline all invitations to conduct tests. Generally speaking, any claim made for a new device must be supported by technical descriptions and certified test data obtained, preferably by an independent test agency.

Open Minds

Those responsible for the conduct of the water supply research and development effort are not enthralled by wild and unsupported claims and multicolored brochures. Neither are they interested in "little black boxes" that allegedly perform miracles in accordance with supernatural laws quite beyond the comprehension of all save the developer. Procedures followed are sufficiently flexible to permit evaluation of each case on its own merits. The Corps is particularly anxious to protect the individual who may have a most valuable discovery but can afford to provide little else except the basic idea. In all cases the Corps of Engineers is interested in any suggestion that will assist in the accomplishment of assigned missions. The social, financial, or political status of the source of the idea is of no importance. The Sanitary Engineering Branch of the laboratories is staffed by engineers and other professionals who take pride in maintaining unprejudiced minds and an open door. They can be convinced by data, properly supported. The door is always open to anyone desiring an opportunity to tell his story.

The magnitude and the importance of the water supply research and development program is indicated by the facilities that have been made available to support the effort. The facilities provided at Fort Belvoir include chemical and bacteriological laboratories, a laboratory machine shop, and complete hydraulic test facilities. All facilities are housed in a perma-

nent-type structure which also provides office and engineering laboratory space.

Other test facilities at Fort Belvoir include a well-equipped field station at Whitestone Point (said to be George Washington's favorite fishing hole). Here, raw water from the Potomac is available for test purposes at the site, and facilities are available to pump the water to the main laboratory.

Here too, in the backwater of Gunston Cove, may be found, in season, heavy growths of algae and frequent fluctuations in turbidity.

To supplement these facilities and to provide a broad base for research and development, field stations are provided at Fort Churchill, Canada; Yuma, Arizona; and Oakridge, Tennessee. For use as required, arrangements exist for temporary stations at more than a score of sites in the United States, Panama, and Bermuda. A mobile laboratory designed to support chemical, bacteriological, and radiological investigations is provided for use in the field.

The human element is of primary importance in the conduct of research and development activities. The technical personnel responsible for the water supply research and development program represents more than 150 man-years of experience in this particular field.

The Program

The current water supply program of the Corps of Engineers may be divided into the two obvious divisions: research and development. The development activities under the program may be further divided into three parts which reflect the three basic sources of raw water in the field; these sources being surface water, ground water, and sea water. Let us consider each of these parts of the program, in turn, and review the significant problems involved and progress made to date.

Surface Water

Surface water is the most important raw water source available to a military force in the field. It is readily accessible and intelligence is usually available to permit advance planning for its use. At the same time, it may be turbid and contain any combination of undesirable materials including pathogenic organisms and battlefield contaminants. Notwithstanding, the water supply mission requires that equipment and a method be available to produce safe and palatable drinking water from all normal surface water sources.

The military requirement further dictates that the one and the same method must be applicable to equipment varying in size from a capacity of less than 10 gallons a minute to more than 250,000 gallons a day. If this seems to be something less than difficult, then consider the requirement that equipment which must be dropped by parachute, and other equipment which is assembled and constructed in support of semipermanent facilities, must have the maximum possible interchangeability of spare parts and use essentially the same expendable supplies.

More than 6 years of research have been devoted to the subject of surface water purification. Always of importance in these studies have been the requirements that water produced in the field must be palatable as well as safe—safe under *all* conditions of combat. In the course of research in this fie'd, no stone has been left unturned. This search for knowledge has carried us through the halls of some of America's finest universities, to the security-hushed laboratories of the Atomic Energy Commission, to the shores of Hudson Bay, and to the laboratories at Fort Belvoir, where the wildest dream is an accepted possibility until it has been evaluated and discredited.

The development program today is based

upon the findings of this research. The processes to be used in Army water purification equipment will include the following: raw water treatment, filtration, and disinfection. The capability of removing odors, tastes, and special contaminants will be provided in the basic designs and processes.

Filtration and Disinfection

In the search for solutions to surface water purification problems the efforts of the laboratories have been rewarded by more than expected success. Water treating processes and equipment recently announced by the laboratories, appear to offer practical answers to the basic problem. In keeping with the origin of the idea and the development, the high rate solids-contact clarifiers that will be the primary components of tomorrow's field water supply equipment will be known as Erdlators. Filtration and disinfection, like water treatment, have been studied at length. Diatomite and sand filters can now be designed in accordance with new data that make mockery of many of the early attempts to provide filters for field use. Extensive research on disinfection by the laboratories, concurrently with investigations by one of the leading universities of the world, have brought us back to the starting post. For the military application, chlorine has been rediscovered as the disinfectant of choice. In addition, chlorine has been demonstrated to have value beyond the requirements for a disinfectant and should rightly be considered a versatile tool in the treatment and conditioning of water.

When the results of these studies were combined and subjected to rigid inspection, a new milestone was erected. Effective treatment combined with improved filtration has not only demonstrated that safe water can be produced under the most difficult combat conditions, but that the goals of safety and palatability may be readily achieved at the same time. Certainly, there is little to support a requirement for "chlorine cocktails" in a water treated by a process that usually produces safe water without the benefit of any disinfectant.

Efforts, in the predictable future, to solve the surface water purification problem are expected to be crowned with success. Solutions to existing requirements are already on the drafting boards. Millions of gallons of safe and palatable water, produced by prototype equipment, have gone down the drain or to appreciative consumers. For the first time in military history, it appears that water can be produced on the field of combat that will be the equal of that produced by most fixed facilities in the United States and superior to many. Surface water purification equipment required by the Corps will be procured in the future—as at present —in accordance with detailed drawings and specifications.

Ground Water

The current ground water program is not unduly ambitious and takes cognizance of the basic limitations relative to exploiting ground water in the field. Over the past several years, many of the problems of well drilling equipment and methods have been solved. Today, the Corps of Engineers is prepared to exploit ground water supplies in the field using machines and methods adapted from civilian practice or developed by the laboratories. Current work is generally limited to increasing knowledge concerning the problems of locating ground water and constructing wells in arctic and subarctic areas. Of particular interest to the Corps in planning future work are findings of recent studies that in many areas of importance, ground water, while available, contains sufficient dissolved materials to preclude its use for drinking without further treatment. The requirement for

demineralization of ground water in the field is currently under study.

Sea Water

The Army requirement for producing drinking water from the sea grew out of its operations in the Pacific Ocean areas during World War II. Today, all of the services recognize requirements in this field. The current Corps of Engineers' program is devoted to the study of a number of problems—not necessarily related—having to do with the design and operation of thermocompression-distillation equipment. Attempts by industry to demineralize sea water by means other than distillation are being followed with interest.

The most serious deficiency in the thermocompression-distillation equipment has been the loss of efficiency due to scaling of heat transfer surfaces. Numerous methods of scale prevention or control have been evaluated and recent progress has been encouraging. Based upon research by the University of California, the use of citric acid has been recommended for Army use in the field. Several other methods of scale control or prevention have been suggested and certain of these methods appear to deserve further study by the laboratories. Work done by Langlier, Spaulding, and others has suggested the use of a bed of sand or other material to reduce or control the scaling of distillation equipment. While not particularly applicable to the military field problem, the method appears to have merit under favorable conditions.

Also of interest is the suggestion resulting from research that metals such as aluminum may be substituted for the more critical and expensive materials currently used. This possibility is being studied in detail by the laboratories and test equipment will be available in the near future.

At present, the Corps of Engineers is prepared to supply distillation equipment in four different capacities, three of which require equipment having similar military characteristics. Studies, not yet complete, indicate that these four units may be satisfactorily replaced by two units without compromising the military requirements. If this is confirmed by the completed study, it appears that future requirements could be satisfied by a portable unit and a stationary (garrison) unit similar to that recently developed and tested at Bermuda by the laboratories. This latter unit is rated at 1,000 gallons an hour and has a maximum capacity in excess of 1,500 gallons an hour.

The current program provides for a careful review of all methods of sea water demineralization which may be practical even though methods to adapt them to the military application may not be at hand. The study is continuing but, at this time, there appears to be no reason to assume that methods superior to distillation will become available in the predictable future.

The Future

The pathway ahead appears long and difficult. Progress in some areas will come but slowly. In some instances, even the basic problem has defied definition. On the other hand, there has been opportunity to drink deeply of the heady wine of success. The Corps of Engineers faces the future of the water supply research and development program with a degree of optimism. The road ahead may indeed be long and frequently unlighted by either knowledge or experience. However, progress to date gives rise to the belief that those responsible for conduct of the water supply program have already acquired the most important requisite for success in any research and development: a clear understanding of where you are going.

PILOTS OR ROBOTS?

Brigadier General Dale O. Smith, *United States Air Force*
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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

IS THERE a future in manned air vehicles? Or will the pilot be replaced entirely by servo-mechanisms? Guided missiles have been developed startlingly since the *V-1s* began rumbling over London in 1944. Have they made the pilot obsolescent?

I think we have been led by two main influences into granting human capabilities to the so-called thinking machines which guide our missiles. First, it seems popular to be a visionary in this age of breathtaking technological advance. And the easiest way to prognosticate the future is to extrapolate various trends and say, "Look, here is obviously where we are going because we have already started in this direction." Unfortunately for the visionary, the stock market does not always keep rising. Nevertheless, as long as the trend continues, everyone climbs on the bandwagon and congratulates himself on his ability to foresee the future.

Second, we feel the potentialities of science to be boundless. Scientists have continually confounded us with new knowledge and devices, but when they gave birth to the cataclysmic atom bomb, any doubts as to the ultimate limits of science were washed away. "Science can even duplicate the human brain," we say. "Why, look at the electronic calculators which can solve problems hundreds of times faster than a skilled mathematician."

Scientific Skepticism

Yet the scientists themselves are skeptical. Dr. Howard Aiken of the Harvard Computation Laboratory has said of his famous Mark IV, "It is merely a computer—fast, accurate—but nothing more than a slavish automatic device designed to help us solve mathematical and mechanical problems." Even the originator of cybernetics, Dr. Norbert Wiener of the Massachusetts Institute of Technology, hesitates to predict that calculators will ever duplicate all the activities of the human brain.

A final influence has, I believe, resulted in a rather wholesale acceptance of guided missiles as the exclusive vehicle for future air war. This philosophy underplays the complexity of air war and treats it as a cut-and-dried kind of science. A science that can be calculated and forecast with precision—so many miles to fly, so much

If we are to prevent the military pilot from becoming extinct, we must restore him to his rightful stature as the exponent of air war and again consider his future to be as enduring as the need to think

weight and fuel to carry, empirical probabilities of penetration and target hitting with so many kilotons of explosives—adds up to victory. We talked this way before and during World War II, but found out, as with all war, that the empirical probabilities (like the trends of curves) had a disturbing habit of never remaining constant or predictable. Our combat air leaders became more and more convinced that war was as much an art as ever—a contest of wills, strategy, and quick decision based upon fragmentary information.

The guided missiles vision may well be right, but more analysis of this trend is certainly indicated when we are possibly committing our entire destiny to this kind of air warfare. The comfort of believing oneself right merely because 50,000 others have made the same bet, could turn into excruciating pain, or death in this case, if the dark horse comes in.

Pilots are hard to come by. Years of training and experience are necessary to produce air fighters, and still more to produce air leaders. There is little future for a pilot if the present trend continues, because most air weapons of the future will be automatically controlled. There will be no switching back to manned aircraft if we later learn that the thinking machines cannot perform as well as man.

Last Manned Interceptor?

An article in *Air Force* magazine (December 1952) prophesied that we were building our last manned interceptor. From then on it will all be done electronically and much more efficiently, said the writer, because we will save on the pilot's weight and not be bothered in our design with things like G-forces and breathing oxygen. This is all very well, provided the enemy does not counter our electronic controls. Unfortunately, we have always seemed to tangle with an enemy who was a lot smarter than we had expected. And after the shooting started we quickly modified many of our plans and almost every piece of equipment.

Supposing the enemy does counter our electronic controls, what then? Do we sit in our dugouts and design new ones while he bombs us manually? Do we expect our factories to turn out new gadgets while being bombed? It might be prudent to fall back on an interceptor with a control that is more difficult to jam—namely, a pilot.

Guided missiles are definitely here and provide us with many new and terrible weapons. I do not wish to belittle their effectiveness nor their necessity, but rather to examine the concept that these weapons will replace airborne fighting men. Just as artillery supplemented rather than replaced the infantry, may not guided missiles supplement rather than replace the manned Air Force?

What can a missile do, ultimately? It can be directed toward a target by certain influences, principally electronic. It can home on a blip that it "sees" on its radar or ride a beam which is directed at a target by some human being. It can conceivably home on nonelectronic discriminations such as heated objects, magnetic fields, and certain predicted sizes and shapes. Or it can be designed to navigate to a certain point in space by celestial guidance.

A crude weapon is one that navigates by dead reckoning—flying a certain time in a certain direction at a certain speed, like the *V-1* and *V-2*. Most people feel this guidance is so inaccurate as to be wasteful, yet it is least likely to be countered. In fact, it can be stopped only by damag-

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ing the missile in flight, or by preventing it from being launched.

Every guidance system has a certain number of predictable judgments built in. It can be made to recognize its target in some measurable way by postulating certain stimuli.

But that number of responses will be a a finite, limited number. Only the human intellect can truly recognize a new, unpredicted situation, relate the knowledge thus gained to a vast store of experience and then come forth with a novel solution.

Some machines can even be made to repair themselves when things go wrong, but the possible troubles must still be predicted ahead of time. Unhappily, there is always something unexpected going wrong with a gadget.

At this point the un-precise human mind gets into the act, finds the trouble, and corrects it.

We need machines, more and better ones. They protect us from human error, extend our senses, and provide new tools for our intellect. But any thought of them replacing the intellect seems just a little beyond reality.

Why is this intellect needed in the air? Why can it not hide in a dugout and do everything by remote control?

A Foolproof Missile

A recent science fiction story told of a "foolproof" guided missile. The superb specifications of this hypothetical weapon are worth noting. Its range was half the earth's circumference, its speed Mach five (about 2,800 miles an hour), its ceiling 170,000 feet, its warhead could devastate an area 30 miles in diameter, and it had an accuracy of plus or minus 1 mile. It was guided by dead reckoning and celestial means and, therefore, not subject to jamming. Built into it were marvelous counter-countermeasures which did such things as prematurely detonate the proximity fuzes of approaching rockets. Let us examine this amazing dream from the standpoint of military science.

Interception

First, the launching of such a huge machine would not likely go unnoticed. It would have had to be tested at great ranges, and word of its existence would probably leak to the other side. Next, its flight could be picked up by radar and defending missiles started on intercepting tracks. Even at Mach five it would take 2 hours en route for an intercontinental shot, and if we assume the defenders are as advanced technically as the attackers, an interception would be by no means impossible. But if the attacking weapon has a device which prematurely explodes defending influence missiles, would a man in the defending missile serve a good purpose? No radiation can explode *him*. He may launch smaller rockets with various kinds of fuzes on collision courses, or perhaps choose several weapons until he finds one that the attacking missile had not been designed to counter. Only a human intellect can cast about for an entirely new method of solving a problem.

Now this human mind can be in a bomb shelter, of course, and select different kinds of defending missiles to shoot at the intruder. But no matter how great future speeds become, we must still contend with the factor of time. When the intellect is far from the scene of action, it must wait some time before it can evaluate the effect of its effort. In the meantime, the intruder is that much closer to its target. The nearer the intellect, the more chance for a second, third, or fourth try, each capitalizing on what was learned by preceding failures.

The man in the bomb shelter could launch a series of different kinds of defending missiles, but without any feedback until the long interval when the first missile hit or missed. Up to this time he would be guessing. Then, if he discovered a

weakness, the underground intellect would be hopelessly committed before learning the effects of his defending weapons.

The first question in speculating about this kind of combat is the inability to turn at such high speeds. On a reciprocal approach course, the manned defender would likely have no more than one pass at best. The pursuit curve is obsolescent even with today's speeds. So head-on tactics would probably be just as effective with automatic weapons as with manned aircraft when considering a duel of a single intruder against a single defender.

Military Tactics

But here is where military tactics come into play. War is not a simple multiple of individual fights. Suppose we have a number of manned defenders. The first misses, but learns that the intruder can prematurely detonate a proximity fuze. He radios to the second defender, who sets his fuzes for contact bursts. But the intruder has a mechanism which, if it senses that the proximity fuzes fail to explode automatically, jerks the missile into violent evasive action, causing the aimed rockets with the contact fuzes likewise to miss. So the second defender passes this news on to the third, who tries a radar homing rocket, but countermeasures in the intruder spoil its guidance. All this action may have taken just a few minutes, but in that time human intellects plus human communications have learned quite a bit about the intruder: proximity fuzes are ineffective, it evades aimed rockets with contact fuzes, and it deflects radar homing rockets. What next?

The defenders could exhaust the entire bag of scientific tricks. But to make the problem as puzzling as possible, let us assume this marvelous intruding missile adequately counters every one. Now what?

This is the time for the much maligned military mind to suggest a solution. Somewhere near the scene of action is a manned defender carrying a military commander. He has all the facts learned in the series of abortive attempts. Approaching the intruder are dozens of defending craft, strung out and closing at full throttle. The obvious thing is to try multiple attacks, to concentrate, to try the barrage or shotgun tactic. If the barrage is heavy enough, no evasive action will save the missile.

The air commander radios the closing defenders to take up a box type formation on a designated leader, and to fire their rockets simultaneously, aimed, and with contact fuzes. If the intruder escapes this, the air commander may try the same tactics with larger formations. If the commander has enough strength, the intruder is bound to be shot down. It is simply a matter of probability.

No Walled City

Up to this point we have considered only the head-on attack. Are we limited to this? Only if we base our defending aircraft near the targets we wish to defend.

But must we? Is this not like building a wall around a city? And have not all such walls been breached by determined invaders? Has not military history told us that the way to deal with an intruder is to attack him in the field on our terms, rather than hole up so that he can lay siege?

If we base our defending fighters near his borders, and nearer his launching areas, our tactics can become a stern chase. If we catch him, we can throttle down and stay with him, harrowing him constantly with every conceivable scientific and tactical weapon at our command. From the standpoint of pure air combat, this tactic should give us much more promise of success. What can make it feasible?

First, we must fly fast enough to overtake the intruder. Suppose we had Mach ten capability. This is not unreasonable

technically if we postulate an intruder with Mach five and give him, in addition, a massive payload and world-wide range. The defenders could trade payload and some range for speed and very likely double the intruder's speed. In the short history of air war, it has generally been true that fighters can outrun bombers, and unless the laws of physics are changed or fighter development lags (as it sometimes has) this will probably remain true.

Acceleration and Man

Next, can a man take the acceleration to Mach ten fast enough to make a chase worth while? The School of Aviation Medicine has determined that a man can reach Mach ten in 3 minutes without any ill effects. We must assume, too, that the friction heat barrier has been overcome. With a 5-minute scramble, 8 minutes would be required to put our pursuit craft aloft at Mach ten. If the intruder was as much as 1,000 miles ahead, he could be caught within 30 minutes, which might provide up to an hour of combat in a stern chase.

Early warning of the intruder's takeoff, course, speed, and altitude would be essential to success. But remembering that we are talking about the far-distant future, we can postulate this kind of intelligence with little hesitation. In World War II, German controllers had almost immediate information of attacks coming from England. We can assume that future developments will extend the range of warning systems to give equally prompt notice. Defending fighters, if strategically disposed, would have much less than 1,000 miles to close on the intruding missile.

A Running Defense

With a running fight type of defense, the minds in the defending craft would have still more time to evaluate the situation and devise means to bring down the intruder. Defenders could concentrate their force and stay with the missile. All the measures of bringing down the hostile craft which were discussed earlier could be attempted, and more. Several defending craft could overwhelm the single intruder with the power of their electronic emissions, countering the counter-countermeasures of the automatic missile. The defenders could fly formation with the missile and pepper it with deflection fire, or in desperation, ram it. Like the British fighters who spun in the *V-1s* by overlapping wingtips and flicking the missiles off their gyros, the intellects in future defenders could think up new methods of downing the intruder. But such new methods would never become apparent to the man thousands of miles away in a dugout.

What could the underground controller learn by watching the blips on his radar scopes? He would see the blip formed by the intruding missile, and the closing blips of the automatic defenders he had launched. He would watch the blips merge, but see the intruder continue and the defending missile vanish. Would he know that the intruder had prematurely detonated the proximity fuzes of the defender? Or that the defender was brought down in some other manner? He would only know that the defending missile had been destroyed and the intruder was still on the way.

The Pilot's Advantages

One may question the ability of the airborne mind to collect more information than the underground controller, considering the terrific closing speed and the limitations of sight. But the observer on the spot will see something, and whatever he sees will add to his knowledge of the true situation. Moreover, the airborne operator will have radar, and there is another law of physics which will permit him to see more by this means than does the distant ground controller. Electronic emissions decrease proportionately with the square of the distance from their

source. So the airborne radar observer will see considerably more detail and thus acquire more information.

No matter how one looks at the question, it seems that the flesh and blood man is just coming into his own in the air. The complexity of equipment is making him more essential to the air battle.

When we deal in military terms of strength, numbers, tactics, and strategy, rather than in the single units of attack and defense which fascinate the physical scientists, we must consider infinite combinations of weapons and as many possible maneuvers. The air war becomes so complex that no systematic methods have yet been suggested for conducting it. Like surface war, it becomes an art rather than a science. Those who attempt to codify such military operations merely lay themselves open to discovery and defeat. It is as hopeless to make a precise science of warfare as it is to coax a new sonata from an electronic computer, or to establish a mathematical formula for producing a Rembrandt.

We have had the automatic pilot for many years. It has freed the human pilot of much stick and rudder work and has given him time to perform other duties. Even takeoffs and landings can be performed mechanically. But the pilot will still be required to overrule the machine in an emergency. It will probably be many lifetimes before we entrust million dollar aircraft and highly trained crews to the whims of a robot pilot. A modern ocean liner can cruise unaided on the high seas and is brought in and out of ports by local pilots. But there has never been any thought of discarding the captain.

Future Commanders

The air commander of the future may seldom need to manually control his craft, but other duties will keep him busy. First he will repeatedly check and double-check his numerous control mechanisms to be sure they are performing properly. As now, he will likely require a crew to help him. Similarly he will examine and test his power and his weapons. Present mechanisms can be made simpler, to be sure, but we are perpetually wanting mechanisms to perform more functions more precisely. The resultant trend has been toward increased complexity. When a mechanism takes over one duty of the pilot, two more duties are added with other new mechanisms.

Conclusions

The ultimate reason that the pilot is here to stay, however, is that only he can appraise a situation that has not been predicted. Only he can conceive of military opportunities, enemy vulnerabilities, and dangers to friendly forces on the spot. And only he can think up tactics to meet the new circumstances encountered. Ability to fly is just one of the hundreds of skills he must master, but it is, nonetheless, fundamental to a balanced understanding of air war.

We are hypnotizing ourselves into believing the military pilot is devolving into a dodo, and young men are reluctant about pursuing a moribund profession. The drama of technical progress has blinded us to the true and inimitable nature of the human intellect and its role in air war; so much so that a career in engineering or the physical sciences seems to hold far more promise.

If we could blind the enemy similarly, we would have no serious worry, but unhappily he is not as impressed with complicated devices as we are. It seems time that we restore the pilot to his rightful stature as the exponent of air war and that we consider his future to be as enduring as the need to think.

Armed Forces Radio Service

THE United States Armed Forces Radio Service (AFRS) is a joint Army-Navy-Air Force military activity organized under the Office of Armed Forces Information and Education, Department of Defense. Its mission is to provide educational, informational, and entertainment radio programs to United States military personnel overseas and on Navy ships outside the continental limits of the United States.

In its overseas transmissions from Los Angeles and New York, AFRS shortwave is feeding a total of 18 hours of programming daily to every major Army, Navy, and Air Force area in the world. Of this 18 hours, a total of over 10 hours serves the specific purpose of informing the military listeners of the big and little issues of the day and exploring their meaning. Overseas outlets may rebroadcast these shortwave programs direct to their listeners, or they may record them for later delayed broadcast with equipment provided for that purpose.

With a carefully plotted pattern of transmitter beams, frequencies, and time blocks, the AFRS shortwave service puts a clear signal into every major and most minor overseas theaters, including the Atlantic, Europe, North Africa, Middle East, Alaska-Aleutians, Pacific, Far East-Asia, and Caribbean. All of these areas are fed a daily shortwave bill-of-fare that includes frequently scheduled news summaries and extensive coverage of news programs delving into the backgrounds and side trails of the news, a maximum of forum-discussion-interview type programs, and a ration of special events that includes the very best coverage of America's domestic radio networks plus the reporting facilities of AFRS itself.

AFRS was not created solely to entertain Americans overseas, but to give them a greater awareness of why they fight, and candid news of how the fight is going. This was one function of shortwave broadcasts beamed first from San Francisco and New York, and, after January 1946, from AFRS headquarters in Los Angeles.

Wherever United States Armed Forces are stationed, they receive terse, undoctored accounts of the happenings in their own theaters of operations as well as the others. AFRS brings news of home and every corner of the United States.

All AFRS radio broadcast transcriptions are manufactured by commercial jobbers. These transcriptions contain regular half-hour radio programs recorded from the commercial radio networks in the United States. The most popular musical, comedy, dramatic, and informational programs heard on American radio are represented here. By arrangement with sponsors and their agencies, all commercial material is removed from these programs before they are manufactured into AFRS transcriptions.

The records, 10,000 weekly, are then shipped to the overseas outlets which now number 72 standard broadcast stations. The stations do their own programming.

The shortwave and overseas broadcasts of Armed Forces Radio Service are programmed to give American military personnel a variety of listening that will keep them the best informed soldiers in the world

In addition to "decommercialized" programs from the networks, AFRS also writes, produces, and directs several radio shows tailored especially for a serviceman-listening audience. These original AFRS productions utilize talent made available by the guilds of radio, television, and motion pictures.

AFRS comprehensive educational and orientation project has been built up gradually throughout the 12 years of its operations and planning.

This programming represents a wealth of assistance for the information and education (I&E) officers in the field charged with the job of keeping their personnel "the best informed soldiers in the world."

The Service uses seven giant shortwave transmitters on the West Coast, beaming radio programs direct from Hollywood to military listeners throughout the Pacific area, from Alaska to Southeast Asia. The New York office of AFRS also beams shortwave sports and news to service personnel stationed in Europe, the Middle East, and the Caribbean.

News is reported hourly in 5 or 15 minute broadcasts, with an additional 45 minutes read at dictation speed which can be copied by personnel either at small overseas stations or on ships at sea who will disseminate it through their facilities.

All AFRS news is compiled from the wires of major news services, Pentagon releases, and other recognized news agencies. Experienced news editors process the news, being sure to avoid material of a dubious or nonfactual nature. This is imperative because AFRS military and civilian audiences overseas expect "The Voice of Information and Education" to speak with honesty and objectivity.

Special events—including the major sports contests which for soldiers overseas form a precious link with home—rate a high priority on the AFRS shortwave log. The World Series of baseball, championship prize fights, football contests, golf tournaments, political conventions, general elections, all are beamed out either live or with the briefest delay.

With the exodus of thousands of Americans into the Pacific area, AFRS has doubled its shortwave news, sports, and news feature service and added to its programming facilities to serve better the military personnel who are over there.

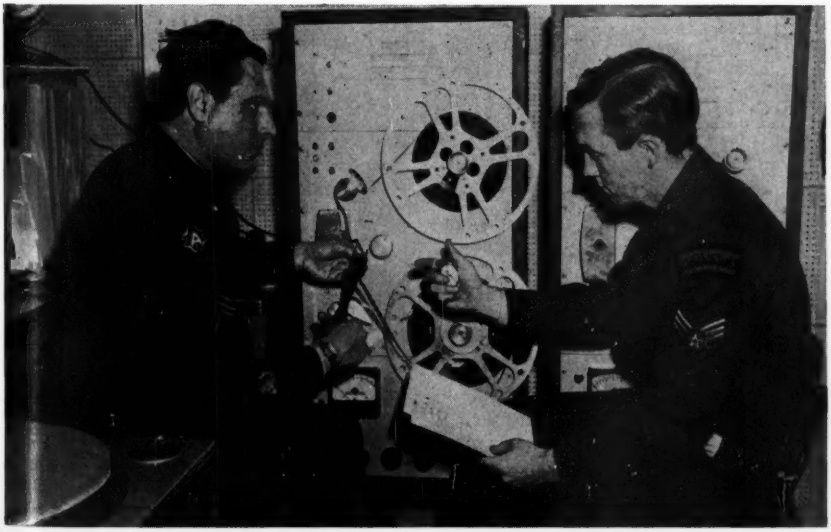
Other services supplied by AFRS include the distribution of recorded selections to augment the individual overseas stations' basic music libraries, and the supply of radio broadcast equipment and spare parts to overseas outlets.

Each week the latest musical releases are recorded for the AFRS Basic Music Library and distributed to the 72 Army, Navy, and Air Force AFRS stations overseas. AFRS ships about forty thousand transcriptions a month at the present time.

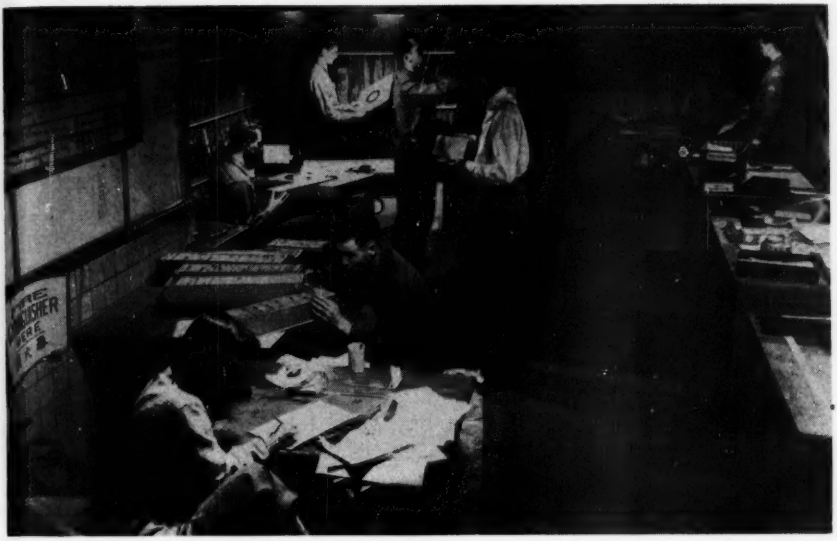
To the huge overseas audience served by AFRS transcriptions can be added the thousands of patients in 53 Army, Navy, and Air Force hospitals across the country for whom AFRS maintains its "Bedside Network." To these hospital stations, equipped with 4-channeled wired systems for simultaneous broadcasting throughout the hospitals, goes a special unit of AFRS productions. As an acknowledged morale factor in the rehabilitation of convalescent servicemen and disabled veterans, the "Bedside Network" combines the best of commercial and military radio fare for their listening pleasure. Hospital commanders have high praise for AFRS.

AFRS keeps looking ahead and scrutinizing possible new ways to make its audience the best informed listeners in the world. It intends to speak frankly, informatively, and without bluster; but above all, to make sure that its voice carries wherever United States military personnel may be stationed and to talk to them in their own language.

AFRS news is compiled from major wire services and Pentagon releases for transmission overseas. All shortwave broadcasts, except news and sports, are tape recorded. Above, news editors preparing items for 13 AFRS hourly newscasts daily. Below, AFRS personnel editing a tape-recorded shortwave broadcast.—Department of Defense photos.



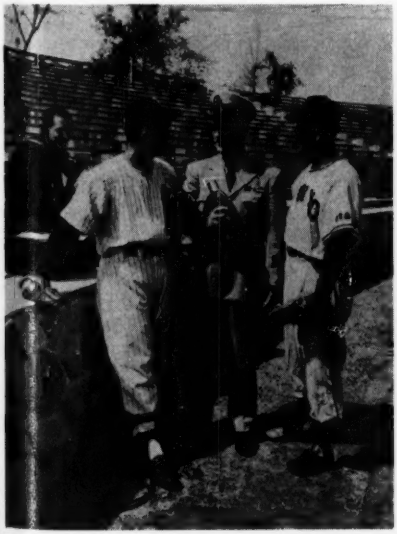
Wherever United States personnel are stationed, Armed Forces Radio Service brings them news of their own theater in addition to "stateside" programs and transcriptions. Above, the administrative and transmitting vans of the "Gypsy" AFRS in Korea. Below, AFRS personnel broadcasting a disc-jockey program in Korea.—Department of Defense photos.



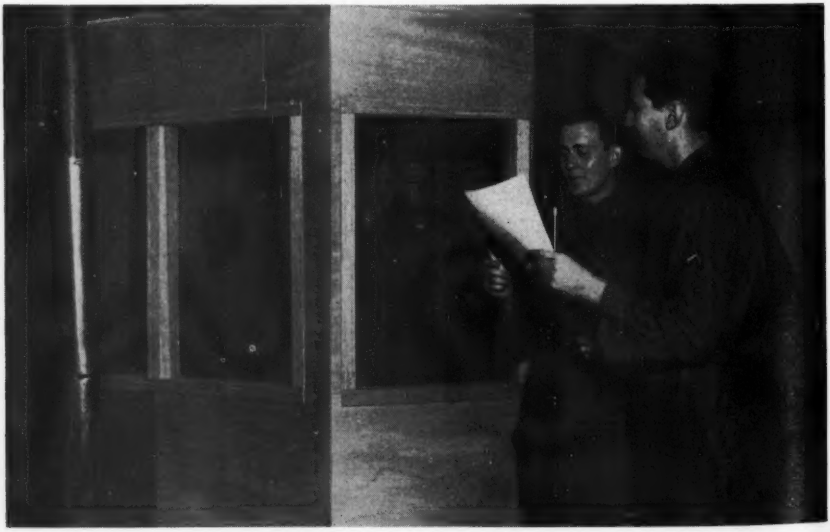
With the exodus of thousands of American troops into the Pacific theater, AFRS has doubled its shortwave news, sports, and news feature services and added to its overseas station facilities. Above, the staff of AFRS station "WLKD" working in Japan. Below, a disc-jockey broadcasting from AFRS, Tokyo, Japan.—Department of Defense photos.

The traditional big special events are given thorough broadcast coverage by Armed Forces Radio facilities. Above, AFRS personnel combining and comparing the 1952 General Election returns as gathered from all major news sources. Below, AFRS personnel broadcasting results of the 1952 General Election returns.—Department of Defense photos.

Special event reports and interviews rate a high priority on the AFRS shortwave log. Above, AFRS personnel covering the National Hobby Show in Los Angeles. Below left, an AFRS reporter interviewing baseball players during spring training. Below right, an AFRS reporter interviewing a soldier at the front in Korea.—Department of Defense photos.



In addition to "big name" programs from the United States, AFRS writes, produces, and broadcasts its own radio shows. Above, an AFRS production engineer spinning the dials during the Korea network show "Onstage Korea." Below, members of the Troubador Radio Station, X Corps, in Korea, broadcasting to troops.—Department of Defense photos.



MILITARY NOTES AROUND THE WORLD

UNITED STATES

Remote Control Communications

An inexpensively manufactured remote control set, about the size of a cigar box, which operates by radio, makes the operation of a radio, a radio teletypewriter, or a radio telephone possible miles away from the sending unit. It has proved so promising that the unit has been submitted to the Signal Corps for further tests.

Used in conjunction with the radio *AN/GRC-26A*, a set 2 miles away can be controlled by the "one way reversible" and "duplex operational" methods as easily as adjustments can be made to a radio or television set just a few feet away. The unit is capable of selecting combinations to alternately send and receive at the same time and can cut teletype tape as easily as if a person were sitting at the machine itself. By a simple flick of a switch, radio telephone and telegraph are available.

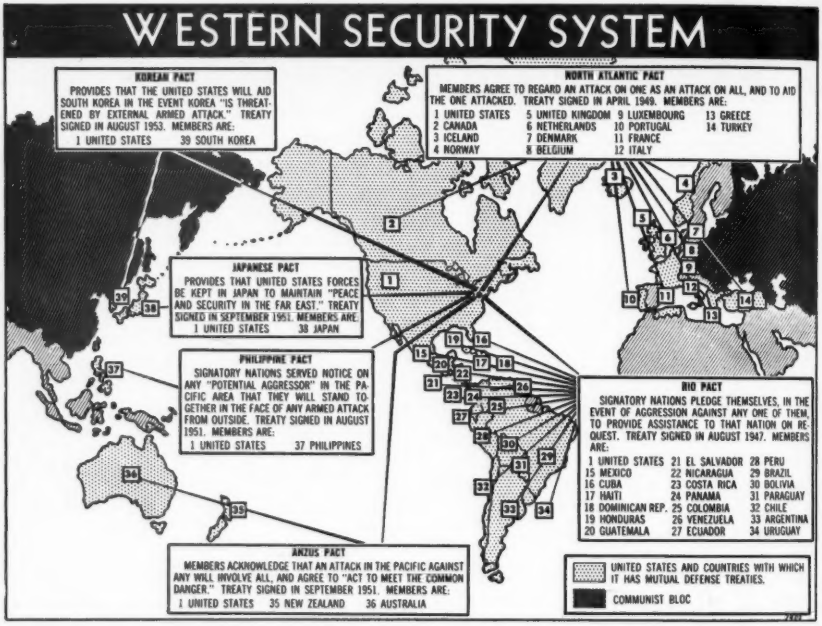
Use of the unit will eliminate the need of an operator at the radio site and frees manpower that can be used to lay wire from the communications center to the site of the equipment. It will also save the cost of wire that normally is involved in a metallic circuit from the communications center to the equipment being operated at a distance, according to the report.—News release.

Wheelless Vehicle

Tests are being conducted on a new transportation development designed to improve vehicular mobility over adverse terrain. Known as the *Rolligon*, the vehicle moves on bags rather than on wheels and was designed to attain the maximum flotation for transporting cargo over terrain where conventional wheeled or tracked vehicles cannot operate successfully, according to the report.

A low-pressure pneumatic bag, driven by a series of powered rollers on top of the bag, is the basic principle of locomotion. The very lightweight construction of the bag prevents power from being applied to a center axle as with conventional wheels. A special power transfer device, using a series of rubber covered rollers resting on top of the bags and positioned in an arc conforming to the bags, was constructed.

Concrete blocks, timber, broken glass, and iron fragments failed to produce any visible damage to the bags in tests. Marshy terrain consisting of soft mud, shallow water, and reedy areas failed to stop the vehicle. Soft snow also failed to seriously hamper the movement of the *Rolligon*. Tests are being conducted by the Transportation and Ordnance Corps.—News release.


WESTERN SECURITY SYSTEM
KOREAN PACT
PROVIDES THAT THE UNITED STATES WILL AID SOUTH KOREA IN THE EVENT KOREA "IS THREATENED BY EXTERNAL ARMED ATTACK." TREATY SIGNED IN AUGUST 1953. MEMBERS ARE:
1 UNITED STATES 39 SOUTH KOREA
NORTH ATLANTIC PACT
MEMBERS AGREE TO REGARD AN ATTACK ON ONE AS AN ATTACK ON ALL, AND TO AID THE ONE ATTACKED. TREATY SIGNED IN APRIL 1949. MEMBERS ARE:
1 UNITED STATES 5 UNITED KINGDOM 9 LUXEMBOURG 13 GREECE
2 CANADA 6 NETHERLANDS 10 PORTUGAL 14 TURKEY
3 ICELAND 7 DENMARK 11 FRANCE
4 NORWAY 8 BELGIUM 12 ITALY
JAPANESE PACT
PROVIDES THAT UNITED STATES FORCES BE KEPT IN JAPAN TO MAINTAIN "PEACE AND SECURITY IN THE FAR EAST." TREATY SIGNED IN SEPTEMBER 1951. MEMBERS ARE:
1 UNITED STATES 38 JAPAN
PHILIPPINE PACT
SIGNATORY NATIONS SERVED NOTICE ON ANY "POTENTIAL AGGRESSOR" IN THE PACIFIC AREA THAT THEY WILL STAND TOGETHER IN THE FACE OF ANY ARMED ATTACK FROM OUTSIDE. TREATY SIGNED IN AUGUST 1951. MEMBERS ARE:
1 UNITED STATES 37 PHILIPPINES
RIO PACT
SIGNATORY NATIONS PLEDGE THEMSELVES, IN THE EVENT OF AGGRESSION AGAINST ANY ONE OF THEM, TO PROVIDE ASSISTANCE TO THAT NATION ON REQUEST. TREATY SIGNED IN AUGUST 1947. MEMBERS ARE:
1 UNITED STATES 21 EL SALVADOR 28 PERU
15 MEXICO 22 NICARAGUA 29 BRAZIL
16 CUBA 23 COSTA RICA 30 BOLIVIA
17 HAITI 24 PANAMA 31 PARAGUAY
18 DOMINICAN REP. 25 COLOMBIA 32 CHILE
19 HONDURAS 26 VENEZUELA 33 ARGENTINA
20 GUATEMALA 27 ECUADOR 34 URUGUAY
ANZUS PACT
MEMBERS ACKNOWLEDGE THAT AN ATTACK IN THE PACIFIC AGAINST ANY WILL INVOLVE ALL, AND AGREE TO "ACT TO MEET THE COMMON DANGER." TREATY SIGNED IN SEPTEMBER 1951. MEMBERS ARE:
1 UNITED STATES 35 NEW ZEALAND 36 AUSTRALIA
UNITED STATES AND COUNTRIES WITH WHICH IT HAS MUTUAL DEFENSE TREATIES.
COMMUNIST BLOC

Unique Plane

A Navy fighter plane, the *XFV-1*, can fly straight up, down, or ahead according to a recent announcement. It has twin jet turbines which operate contra-rotating propellers and allow it to takeoff from a standing start on its tail. Once airborne, it can level off and fly and fight at high speed. The plane is also able to hover stationary in the air and descend for a pin-point landing on its tail. The *XFV-1* has a 4-pointed, X-shaped tail for this purpose.

Ground handling equipment lifts the plane into take-off position and also provides a ladder for the pilot to enter the cockpit. The plane is now undergoing preliminary tests at Edwards Air Force Base, California. It is expected that its first straight-up flight will be made shortly according to the announcement.—News release.

Metal Alloy

The development of a new heat-resistant alloy of aluminum and iron, which some day may be used in items ranging from electric toasters to jet engines, has been announced by the Naval Ordnance Laboratory. Thermenol, as it is known, is light and has a high resistance to heat, oxidation, and chemical corrosion. It is expected to take the place of many present high temperature alloys now used in making jet engines.—News release.

Arctic Signal System

In order to create a long-range signal system in the Arctic for United States bombers, the Department of Defense has asked for about 8½ million dollars. The money would be used to build an electronic transmitter, called *Loran*, around Thule, the strategic bombing base in northern Greenland.—News release.

Antiaircraft Target

Development of an antiaircraft tow target for high altitudes and speeds to replace the outmoded sleeve or banner-type targets for training radar and gun crews was announced recently. The *XM-24*, as it is known, is very similar in appearance to a jet plane without a wing. The target is 19 feet long, weighs about 200 pounds, and is constructed of a tough plastic developed specially for the project. Easily repairable, the material does not shatter when hit by shell fragments.—News release.

Assignment Policy

A change in the assignment policy whereby Army personnel who volunteer for duty in the Far East Command may be further assigned to units in Korea, although they may have served there during the fighting, has been announced. Under the new policy, a soldier reporting for duty in the Far East will be assigned to a unit according to his specialty and the Army's need.—News release.

Search Radar

The most powerful airborne search radar yet developed has been ordered by the Navy's Bureau of Aeronautics. The unit is reported to be twice as powerful as previous airborne radar.—News release.

Missile Billions

In a procurement program that started nearly 4 years ago, the Armed Forces have received or are asking authority to buy more than 3 billion dollars' worth of guided missiles. This outlay is for the actual procurement of missiles and does not include the other multimillion-dollar expenditures for designing, developing, and testing experimental devices. These figures are a measure of the effort being devoted to producing robot weapons to augment and eventually supplant some of the conventional weapons of the three services.—News release.

Helium Need

The Government, the only producer of helium, needs another plant as part of its defense arsenal to keep the supply of the important gas ahead of the demand according to a recent report.—News release.

Turboprop Seaplane

This country's first water-based turboprop transport, the Navy *R3Y Tradewind*, is designed for speeds exceeding 350 miles an hour and is capable of cruising long distances at nearly twice the speed of existing transport flying boats. It is the first seaplane equipped with high altitude pressurization and air-conditioning systems. The 80-ton plane lifted off the water in 30 seconds and its reversible pitch propellers enable the pilot to maneuver easily on water.

The 4-engine plane is fitted with rear-

Turboprop seaplane undergoes Navy tests.

ward facing passenger seats. The deck level is parallel to the water line and at the same height as floating docks in order to facilitate cargo handling. Cargo handling is also speeded by a cargo door 6 feet 8 inches high by 10 feet wide. Many of the components which were operated by a hydraulic system on older planes are pneumatically operated on the *Tradewind*. —News release.

Rotation Policy

A new policy of rotating men to the United States which will give special consideration to senior noncommissioned officers and long-term enlisted men has recently been announced by the United States Far East Air Force. Under the policy, an airman with more than 26 years of active service will be assigned to the air base of his choice when rotated from the Far East. Master sergeants with less than 26 years' service and other enlisted men with from 20 to 26 years' service will be allowed to bid for assignment to one of three bases of their choice. All other airmen will list first and second choices of duty as under the present policy.—News release.

Carrying Strap

A universal carrying strap for lightening the combat soldier's load, which has already successfully passed preliminary tests in this country and Korea, will undergo final tests this summer. It is reported that the strap may eliminate much of the carrying equipment now necessary. It could be used to carry component parts of heavy weapons, large rounds of ammunition, and much of the cumbersome equipment needed in the front lines. If tests prove that the strap is feasible, it will be adopted for Army-wide use.—News release.

Optical Cement

Plasticized cellulose caprate, a superior optical cement which is capable of withstanding the extreme temperature variations and other rigors of naval service, has been developed at the Naval Research Laboratory. It appears to be suitable for the replacement of Canada balsam in all types of optical instruments. This synthetic resin is sufficiently fluid to be cemented at a temperature of less than 250 degrees Fahrenheit, permitting the cementing of large camera lens.—News release.

Powerful Light

Powerful light beams capable of piercing virtually any weather front, thus enabling aircraft to land safely under minimum conditions, will add increased safety to flying. The recently developed lighting system, which is visible to pilots 100 miles away, uses 500-watt lamps which can produce light intensities thousands of times greater than an ordinary automobile headlight.—News release.

'Baby' Jet Engine

A miniature jet helicopter engine, no bigger than an automobile engine but approximately eight times as powerful, has been produced. The *XT-58*, as it has been designated, uses less expensive fuel, is easier to install, uses less oil, and is easier to cool. It also gives helicopter passengers a smooth and noiseless ride.—News release.

Aerial Delivery

A new method to parachute heavy equipment to forward area troops, a possible total of 40,000 pounds in a few seconds, has been devised for the *C-124*, the Air Force's largest cargo plane. The new system uses a pair of rails, a chain drive, and specially-designed pallets to move the cargo out of the aircraft quickly. The entire delivery system weighs about 2,800 pounds and requires only minor structural modification of the plane. In the new method, three of the previously packed pallets are loaded into the plane and hooked to the chain drive. As the drop area is approached, the tie downs are removed and at the desired time the chain drive is started and equipment is easily dropped from the plane. A typical 3-pallet drop load to forward area troops would be a truck or prime mover, a gun, and ammunition, each on individual platforms. As many as six parachutes, each capable of supporting 3,000 pounds, are required on heavy loads.—News release.

Rectifiers

Rectifiers, because of their high power, ease of repair, silent operation, and other valuable characteristics, are gradually replacing motor generators on Navy ships. One of the biggest advantages of the rectifier is that any required number of disks or plates can be assembled easily to make up rectifier units suitable for any amount of direct current power. With the introduction of germanium and selenium rectifiers, it was found that rectifiers are more suitable for Navy uses in converting alternating current to direct current.—News release.

Magnetic Clutch

A new type of magnetic clutch, using graphite instead of oil to lubricate the iron powder, has been developed. The clutch is to be used in low-cost automatic transmissions for cars and trucks, fan drives, and power takeoffs.

In the new clutch, a mixture of iron powder and graphite and a ring electrical coil are located between a circular flywheel housing and the flange of a drum, similar to a brake drum. The drum remains stationary as the flywheel rotates until a small electric current energizes the coil and sets up a magnetic field. The field draws and solidifies the iron powder between the magnetic poles around the flywheel, locking the drum and the flywheel and transmitting power.—News release.

Construction Budget

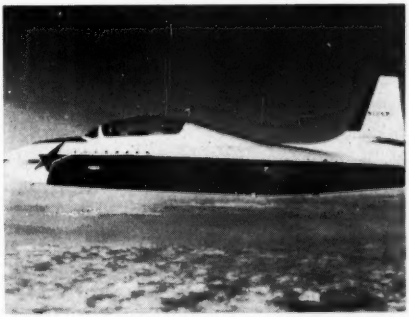
The Navy's 1 billion dollar 1954-55 construction budget before Congress calls for 30 new naval vessels. The sum also includes funds for the conversion of 14 other vessels and an allocation for the repricing of other ships under construction. The program is expected to include the conversion or modernization of two big aircraft carriers and a possible fourth *Forrestal Class* carrier according to reports. —News release.

Jet-Equipped Guard

By the time summer training starts, approximately 40 of the 87 tactical squadrons of the Air National Guard will be equipped with jets, it was announced recently. More than 50,000 Air Guardsmen, assigned to 560 units, will participate in the summer training.—News release.

Aerial Schoolroom

A 600 mile an hour jet pilot training plane, designed to aid in converting propeller pilots into jet pilots, is being demonstrated to the Air Force and Navy. It was built to perform with greater safety than any jet yet developed and has a grandstand-like rear seat, raised 6 inches so the instructor can better observe his student and have improved visibility when handling the plane himself. Engineers say that the plane has a landing-slowdown parachute, speed and climb equal to many combat jets, duplicate navigational and electronic aids, for both student and instructor, full-circle visibility, and improved controllability with movable "slats" added to the front of the wing to permit stalls in complete safety. In addition to its primary training purpose, the plane can be used for instruction in advanced navigation, gunnery, rocketry, dive bombing, and all-weather operations.—News release.



All-purpose trainer is being demonstrated.

BRAZIL

Coal Reserve

A reserve of over 1 million tons of coal has been discovered near Campinas dos Pupos in the state of Paraná following extensive sounding work by the Development and Production Division of the Department of Agriculture.—Brazilian Embassy News Bulletin.

Build Planes

Production will start soon on a series of 100 *S. 11 Instructor* type planes as well as 50 *S. 12* aircraft, nose wheel version of the *S. 11*, it was announced recently. With the exception of the tricycle undercarriage of the *S. 12*, the two planes are practically identical which should prove a great advantage as the main bulk of the spare parts are interchangeable, and yet each plane requires a different type of training.—News release.

ARGENTINA

Increase Trade

An additional 30 million dollars worth of steel and heavy machinery will be purchased from the Soviet Union by Argentina following a report by an inspection committee sent to Moscow. Officials said that the purchases included power equipment, steel and machinery for oil drilling and coal mining, agricultural equipment, and transport replacements. Last year the two countries signed a trade agreement to exchange 75 million dollars worth of goods.—News release.

Aircraft Industry

The objective of the country's second five-year plan is Argentine-designed and built aircraft of which the latest development is the *IA-35* all-metal twin-engine aircraft powered by the 650 horsepower *El Indio* engines. The plane can be used as a trainer, light bomber, reconnaissance, ambulance, cargo, or for other miscellaneous duties.—News release.

DENMARK

Longest Bridge

Plans are being formulated for the construction of the world's longest bridge which will span the 11½ mile wide Strait of Oresund, separating Denmark and Sweden. The bridge, which is expected to take about 10 years to complete, will give Europe its first direct route from the northernmost to the southernmost parts of the Continent. It will be a European parallel to the Pan-American Highway, extending from Alaska to Chile.

The Inland Transport Committee of the Economic Commission for Europe has drafted plans to finance the construction of 33,600 miles of modern, heavy-traffic highways in 20 European countries. Among the plans is a direct road connection from Haparanda, Finland to Lisbon, Portugal—a road running 4,000 miles through nine countries and across one strait, the Oresund, and one sea, the Baltic.

From Finland, the road is scheduled to go to Sweden, with one arm to Norway, then across the Oresund, the Danish Isles, and the Baltic Sea to Germany, where the route would split with one part going through Switzerland to Austria and Italy, and another running southwest through Holland, Belgium, France, and Spain to Portugal.—News release.

YUGOSLAVIA

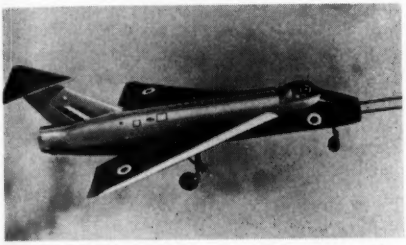
Offshore Contracts

In seeking additional offshore contracts from the United States Army, the Government hopes to keep her war industry going, and, in addition, to gain a place for Yugoslavia among the Western countries entrusted with orders for the manufacture of arms and munitions in the Western defense system. Another reason for her desire to share in this offshore procurement of military goods is the decrease in her expenditures in support of her national defense, a common trend in Europe.—News release.

GREAT BRITAIN

Adjustable Wing

The Short *S.B. 5* adjustable wing research jet, designed for investigation into low-speed characteristics of swept-back wings, is now being flown with its wings



Adjustable wings shown at 60 degree angle.

in a 60 degree sweep-back position. The angle has been stepped up from the original position of 50 degrees, and will again be raised in the near future to the final position of 69 degree sweep-back. It is powered by a *Derwent* jet engine.—British Information Services.

Raise Pay

To combat the loss of skilled officers and noncommissioned officers into better paid positions in private industry, the British Government recently raised the pay of the members of its armed forces. The increases will cost approximately 46 million dollars annually. At the same time, it was also announced that the 1935 pension cuts, averaging about 9 percent to World War I retired officers and to some retired civil servants, would be restored.—News release.

Rationing to End

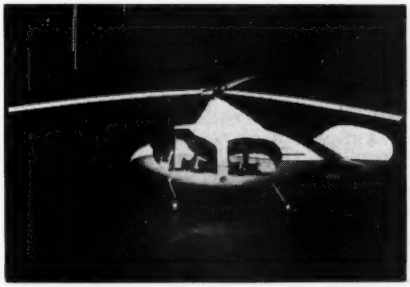
After more than 14 years, rationing is scheduled to come to an end this summer in Great Britain when meat and bacon go into unlimited private distribution. It is hoped to get the slaughterhouses back into private hands in time to make the transition smoothly.—News release.

Mystery Submarine

The first submarine to be launched in Great Britain in 7 years, the *Explorer*, is powered by a special fuel which experts believe may give it greater speed than the atomic-powered *Nautilus* of the United States Navy. It is reported that the *Explorer* will be able to cross the Atlantic nonstop under water without the aid of snorkel breathing tubes. The ship is said to be powered by the hydrogen peroxide fuel now being used experimentally in the United States Navy.—News release.

Gas-Propelled Helicopter

The prototype of a new helicopter, the *P.74*, that will use a Napier high-efficiency, low-pressure, gas propulsion system that avoids all mechanical couplings between the source of power and the rotor, is under construction for Britain's Ministry of Supply. The elimination of the usual cooling



Gas propulsion system cuts maintenance.

and transmission system will greatly reduce maintenance and overhaul, it is claimed. The plane will be able to carry 8 passengers, have a gross weight of 8,200 pounds, and a disposal load of 3,300 pounds.—News release.

Sell Trawlers

The Government has approved the sale of about 17 million dollars worth of fishing trawlers to the Soviet Union.—News release.

USSR

Latest Planes

Information concerning the Soviet Union's latest fighter and new heavy bombers has recently been obtained from sources behind the Iron Curtain. The fighter is the delta-wing *Cheranovsky BITsh-22* which has a top speed of 635 miles an hour and a cruising speed of 530 miles an hour. It is powered by a *VK-2* centrifugal-flow jet. The plane has a ceiling of 46,000 feet. Its armament consists of six 23-mm cannon.

Both the heavy bombers, the 6-engine *Tupolev-200* and the 4-engine *Ilyushin-38*, are swept-wing turboprop planes. The *Tupolev*, with its long, slender fuselage and swept wings, resembles the *B-36*, which has 6 piston and 4 jet engines. The *Ilyushin* compares in size with the 8-jet *B-52*. *Aviation Week* magazine reported that more than 400 of these new bombers were based in the Soviet northern provinces, across the polar ice cap from the North American Continent.—News release.

Weather-Observation Stations

A Soviet chain of stations, numbering about 60, to observe ice and weather conditions extends across the Far North from the Atlantic to the Pacific.—News release.

Armed Forces

Since 1951, the combined strength of the Soviet Union's armed forces has been increased by 150,000—giving a total strength of 4,750,000—a British Ministry of Defense spokesman reported. The increase is mainly due to the growth of the Soviet Navy. The spokesman also reported that the East European Soviet satellite states had increased their strength during the same period by nearly 120,000 and now numbered 1,190,000. China was reported to have armed forces totaling more than 4 million and in addition had from 6 to 10 million men in the militia.—News release.

JAPAN

Make Jet Planes

Under the terms of an agreement signed recently, Japan will begin building warplanes for the first time since the end of World War II. All rights necessary to manufacture the *T-33*, 2-seat jet trainer, and the *F-94C Starfire*, an all-weather jet fighter, have been granted to a Japanese firm. The new planes are presumably for use by the United States.—News release.

Export Ships

Under a barter trade agreement, nine ships valued at 2 million dollars will be exported to the Soviet Union by a Japanese shipbuilding company.—News release.

Giant Freighter

The world's largest freighter, the 60,000-ton ore transport, *Ore Chief*, was launched recently at the Japanese shipyard which once built the world's largest battleship. The ship is slightly smaller in size than the superdreadnaught *Yamato* and its 72,800 tons. It has a cruising speed of 14 knots with two 7,000 horsepower turbine engines.—News release.

Germanium Discovery

The discovery of important deposits of germanium, a new electrical wonder metal, has been reported in Japan's northern island of Hokkaido. The metal, in scarce supply, is used to make transistors—the tiny substitutes for radio tubes. The report by the Kyodo News Service stated that the supply in this one area is estimated to equal almost all other known deposits in Japan.—News release.

NORWAY

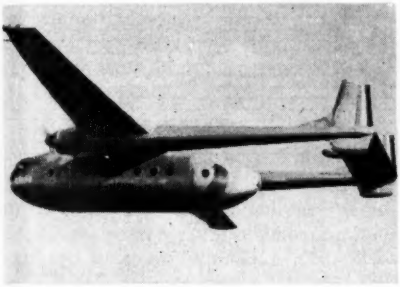
Service Period

The Government has asked Parliament to extend the Army service period to 18 months so that it would conform to that of the Navy and Air Force.—News release.

FRANCE

Transport Plane

The *Nord 2501 Noratlas*, designed as a military transport, is fitted to have quickly detachable seats in paired rows on each side of a center aisle in its box-like fuselage. It is a twin engine craft and with a load of 43,000 pounds, has a cruising speed of 208 miles an hour at 10,000 feet. With its two engines operating, it has a practical ceiling of 24,400 feet. With its cargo space having a capacity of 1,800 cubic feet, it is capable of carrying vehicles. As a passenger plane, it has accommodations for 40 persons.—News release.



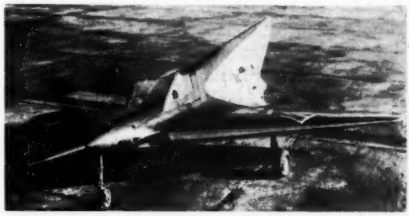
***Nord 2501 Noratlas* is a military transport.**

Defense Policy

The National Defense Budget for 1954 of about 4 billion dollars shows a slight decrease from the budget of the previous year. The Government will receive 914 million dollars in American aid, almost half of which will be used by the national armies of the Associated States. A planned reduction in armament expenditures is compensated by the increase in offshore procurement. There will be an 8 percent decrease in the number of men called up for an 18-month period of compulsory military service but at the same time it is planned to increase the number of career personnel on duty according to a recent report.—French Embassy Press and Information Division.

Experimental Delta Wing

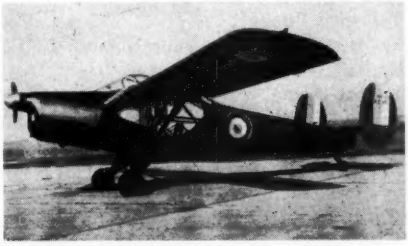
The *Payen PA. 49*, an experimental monoplane built entirely of wood, is undergoing tests. It is powered by a *Palas* jet motor with a thrusting power of 350 pounds, thus permitting a maximum speed of about 250 miles an hour. The plane has a landing speed of 43 miles an hour. The wing has a sweepback of the leading edge of 70 degrees.—French Embassy Press and Information Division.



Jet engine powers experimental delta wing.

Multipurpose Plane

A variable pitch propeller gives the *N.C. 856*, a high-wing monoplane, remarkable take-off and landing performances. The plane combines great robustness and excellent qualities of endurance with minimum weight. It can be used for artillery observation, for liaison, or for evacuation of the wounded. It is powered by a *4 LO 4 Regnier* engine and has a maximum speed of 128 miles an hour and a minimum speed of 43 miles an hour.—News release.



Variable pitch propeller aids light plane.

million men in the militia.—News release.

of the Navy and Air Force.—News release.

TURKEY

Construct Bases

Under the North Atlantic Treaty Organization's support and communications program, it is expected that 5 naval bases and 11 airfields will be constructed in Turkey in the next few years. NATO has approved the expenditure of over 135 million dollars in the country. The program includes the construction of a nation-wide radar network and three major pipelines to supply jet fuel to NATO aircraft based in Turkey. During the year, the United States is expected to furnish 76 million dollars in economic assistance to the country in an expanded program designed to increase Turkey's capacity to support her armed forces. In addition, Turkey will receive about 200 million dollars worth of military equipment and supplies from the United States.—News release.

Islamic Security

A first cautious move toward a larger collective defense system in the strategic Middle East and Asia was seen in the proposed agreement of Turkey and Pakistan to collaborate in defense, economic, and cultural matters. If the situation appears favorable, Iraq, Iran, India, and Afghanistan will be asked to adhere to the treaty.—News release.

GREECE

Military Bases

The United States expects to spend 120 million dollars building bases in Greece, the Foreign Minister reported. This figure is far above the 30 million dollars unofficially reported as the amount the United States would spend.—News release.

Mining Machinery

More than 4 million dollars worth of German mining machinery is being sent to Greece for nickel mining operations on the Island of Evvoia, off the east coast of Greece.—News release.

AUSTRALIA

Antarctic Station

What may become the first permanent human settlement on the Continent of Antarctica and the nearest in habitation to the South Pole has been established by an Australian expedition. The station has been named Mawson in honor of a noted Australian Arctic explorer. Its approximate location is 65 degrees east longitude and 67.5 degrees south latitude.—News release.

CANADA

Plan Dams

A long-range hydroelectric project calling for the building of nine dams on the upper Colombia River system in the interior was announced recently by Canadian officials. A dam at Mica Creek, about 250 miles east of Vancouver, which will cost 400 million dollars is to be the first and key unit in the project. Work is expected to start in about 18 months according to the announcement by the International Joint Commission.—News release.

HUNGARY

Ration Power

Electric power for industry is being rationed according to a recent announcement of the Government. Housewives were requested to be thrifty although the rationing did not affect household consumption. Hungary expects to produce about 5 billion kilowatt hours of electricity this year.—News release.

THAILAND

Training Mission

In order to increase the effectiveness of the Thailand armed forces because of the situation in Indochina, it has been reliably reported that the United States training mission in the country has been increased by one-third. The mission is reported to number more than 300 persons now.—News release.

mation Division.

of 43 miles an hour.—News release.

FOREIGN MILITARY DIGESTS

Invested Fortress

Translated and digested by the MILITARY REVIEW from an article in "Die Deutsche Soldatenzeitung" (Germany) 3 December 1953.

ALL power has its limits—even the Soviet military power. The free world, however, has no reason for reassuring itself with this thought. In the era of total war, strategy is also total, and the number of divisions and air wings one possesses is only a component of strategy. It stands in inseparable relationship with economic, spatial, and political factors which influence in a decisive way the effectiveness of the purely military machine.

In the Kremlin, they are just as aware of this relationship as are the staffs of the Western Powers. The imposing number of the active Soviet divisions and air wings, and the combat worth of the Soviet soldier, are components of the Soviet might which the West must consider. The mere existence of these, in the course of a few years, has evoked truly fundamental changes in the economic and political nature of the world. They have, thereby, proved themselves as highly efficacious instruments of Soviet policy and will continue to play this role. By the use of these instruments, the Kremlin is able to exert a constant influence, according to its own liking, on economic and political developments outside of its sphere of influence. Calculated planning is the chief maxim of the Kremlin. Not alone the stocktaking of the superiority that has been won, but also the augmentation of the same, will be a compelling law until they attain that degree of superiority which will free open conflict of its present risks.

Soviet Security

Anyone who believes this aim to be attainable will avoid all risk in the interim. The lessons of World War II are not forgotten in Moscow. There is no doubt a need for security in the Soviet Union, however, it is of an entirely different kind of need from that of the Western nations. What is to be secured by Moscow are the bases for the world revolution, and the means already on hand and to be created in the future for the dissolution and conquest of the world. The free world will do well not to conclude their own su-

periority on the basis of this need of the Soviet Union for security, or any Soviet anxiety for peace.

There is one strategic component which the Soviets are not able to influence, directly, of course—their extensive expanse of territory. To be sure, technical progress operates in the direction of a steady diminution of area, but far more in the sense of an overcoming of the area than of its domination. Today, it would be no problem for the Soviet armed forces to push forward clear to the coasts of the double-continent of Europe—but the domination of this area still remains a problem. In this field, lessons have been learned from the mistakes of the German *Wehrmacht*. Initial successes conceal the germ of defeat, if one splits his strength and leaves the enemy with a potential of any serious magnitude.

And these are the lines along which the planning of the Soviet strategy is moving today. In their calculations of movements, the world-masters of the political and military chess game are constantly ahead of their adversary. In the middle of the game, the Pentagon now sees itself obliged to undertake complete realignment merely because the Kremlin has executed movements of its combat forces over interior lines. What Korea failed to bring about—the tying down of the American potential in the gigantic areas of China—will now be done through the assembly of a fourth of the active Soviet ground and air forces in northeast Siberia, opposite Alaska.

The sole source of danger to the Kremlin is the surrounding of the Soviet superfortress by the bases of allied strategic air forces. Thus far, Soviet policy has been helpless against this.

The "old-womanish" belief that there is war only where there is shooting has long been *passé*. We are in the midst of war at the present moment—the first real total war. It is being conducted by the adversary with every possible means, and either offensively or defensively, as expediency dictates. As we consider the following statements and figures relative to the strength, organization, and operational principles of the Soviet armed forces, it must not be forgotten for a moment that they are but one of the means of an overall plan which is unmistakably of an offensive character.

Illuminating Figures

The following information is based upon the book, *1954—Peace Has a Chance*, by Mahnke and Wolff, published in Darmstadt, Germany.

Concerning the effective strength of the Soviet *Wehrmacht*, the headquarters of the Atlantic Pact Nations possessed the following Soviet strength figures in August 1953 (the figures in parentheses are given for the beginning of the year 1952; the data are estimated to be accurate to within a maximum limit of 5 percent, plus or minus).

The Army

Armored divisions	63	(57)
Mechanized divisions	36	(39)
Infantry divisions	52	(55)
Airborne divisions	6	(5)
Special Arctic divisions	6	(4)
Cavalry divisions	5	(4)
Artillery divisions	58	(49)
Special Arctic Armored divisions	1	(0)
Total	227	(213)

No fundamental change has occurred within the individual groups since 1952. About half of the artillery and a third of the armored, infantry, and mechanized divisions are cadre divisions which are capable of being mobilized in very short time. The special airborne and arctic units are maintained at full war strength. Supreme Headquarters Allied Powers Eu-

rope (SHAPE) estimates that the Soviet Union can mobilize approximately 27 armored, 1 cavalry, and 45 artillery divisions within 30 days.

The Air Force

The Soviet Air Force is organized into the following divisions:

Pursuit and fighter-bomber divisions	56	(43)
Tactical bomber divisions	8	(8)
Strategic bomber divisions	3	(3)
Total	67	(54)

In addition to these, there are transport, artillery, and courier units. On the basis of documents in its possession, SHAPE estimates that three more strategic bomber divisions can be mobilized within a period of 30 days.

New Army Groups

The 23 military areas, which until recently had been centralized in Moscow, have been dissolved and the gigantic military potential of the Soviet armed forces reorganized into seven army groups. These are:

Northern Army Group with headquarters at Leningrad and an operational sector including northern Europe and the coasts of the western Arctic.

Western Army Group with headquarters at Minsk and an operational sector including Eastern and Central Europe.

Southern Army Group with headquarters at Odessa and an operational sector including the Balkans.

Army Group of the Caucasus with headquarters at Tiflis and operational missions in Iran and Turkey.

Army Group of Turkestan with headquarters at Tashkent and an operational sector including Central Asia and India.

Far East Army Group with two headquarters at Vladivostok and Anadyr, and an operational sector including the Pacific coast and Alaska.

Central Army Group with headquarters at Briansk. This Group must be designated as a general operational reserve.

The Northern, Western, and Southern Army Groups comprise 21 percent of the active ground forces and 8 percent of the active combat air forces. The corresponding figures are: for the Army Groups of the Caucasus and Turkestan, 9 and 11 percent respectively; for the Far East Army Group (southern portion), 23 and 29 percent respectively; (northern portion), 24 and 25 percent respectively; and finally, for the Central Army Group in the triangle, Ufa-Saratov-Tula, 19 and 15 percent respectively.

This new regional organization of the Soviet armed forces has marked a drastic departure from the old traditions of the Bolshevik command methods, whose strength—and weakness—lay in rigid centralization. The newly formed Army Groups are autonomous organizations which, in their supply and transport services, their depot distribution, and military administration, including mobilization organization, are largely independent of one another and of Moscow—or can be.

New Concept

This new defense concept has certain traditions in the Soviet Union. It was experimentally tested for the first time on a modern scale in the Finnish-Soviet war of 1940, when the Leningrad district was mobilized independently for the battle against Finland. The experiences of the German-Soviet war, in which Germany had come within a hair's breadth of defeating the centrally organized military colossus of the Soviet Union, saw the German command operating quite successfully with its armored groups and hedgehog positions. This influenced the Soviet General Staff to proceed farther along this line of independent control. In the late au-

tumn of 1945, Marshal Semën Konstantinovich Timoshenko was already sketching, in a series of lectures at the Frunse Military Academy in Moscow, the principles of a "strategy of attrition adapted to vast terrain expanses" in accordance with which the defense planning of the Soviets has been reshaped.

Traditional Fortress Idea

Timoshenko's strategic concept was developed entirely from the traditional Soviet "fortress idea," whose defensive character, however, has been combined with very modern offensive ideas and rendered elastic. The Marshal explained, at that time, that the Soviet Union, as a continental power with far-flung borders, was in the position of an invested fortress under which condition, the advantages of interior lines could be employed with sudden, concentrated break-outs. These could have as their objective, the disturbance of the enemy's concentration, his unnerving, and, finally, through destruction of his bases, his attrition. They could not have as their mission the occupation of the enemy's assembly glacis—for this would mean the splitting of Soviet forces and would render them unfit for massed operations. The strategic ideas of the Marshal finally culminated in the demands for avoidance of all fixed fronts and the need of elastic tactics so that provisions could be made for break-out efforts to avoid enemy counterattacks. The new organization of the Soviet military system, which began about the year 1950, provided the organizational prerequisites for this strategic concept.

Preparedness

In the Soviet winter maneuvers of 1952, Timoshenko, as commander of the Western Army Group in the White Ruthenian and Southern Ukranian area, made use of these new tactics in a maneuver, for the first time. The formation of modernly equipped combat teams directed by him operated in an independent manner in the rear and on the flanks. They were covered on all flanks only by fast-moving units and were opposed by an adversary assumed to be from the West and moving at a relatively rapid rate of march. In these maneuvers, Timoshenko allowed his armored groups, like a large, independent naval formation, to open up for a frontal attack and then brought them back together again in the form of a rapidly progressing hedgehog formation.

The winter maneuvers in 1953 in the Kamenets-Podolsk area, under the command of Marshal Ivan S. Koniev, made no change in the principle of these tactics. They showed a still closer concentration of the heavy weapons, whereby an augmentation of the fire power of the operating groups was achieved; a greater massing of weapons in engagements because they operated under the assumption of air superiority being in their favor; a notable disregard of speed in attack in favor of mass and power; and unmistakable preference for offensive missions but with limited depth effects, as well as the distinct employment of their own tactical atomic weapons.

Central Army Group

The concrete backbone of this strategic idea of largely independently-operating individual army groups is the Central Army Group, which, as an operational reserve, has its assembly area in the great triangle between Tula, Ufa, and Saratov. Its position has been so perfectly chosen, that slight shiftings are sufficient to put into action the masses of forces assembled in it, either offensively in Europe, in the Near East, in Asia or in the Arctic, or defensively for absorbing enemy attacks from these directions. In this central Soviet area, there may be concentrated a peacetime strength of around 45 divisions. They are composed, in the main, of ar-

mored and mechanized units with modern equipment. In addition to these, there is also the main body of the Soviet special combat elements such as artillery, rocket-launcher, and airborne divisions. The latter are composed of one parachutist regiment, one airborne regiment, and one unit for special commando missions.

This brief review of the strength, organization, and guiding concepts of the Soviet combat forces, suffices to show us that the Kremlin is by no means afflicted with the helplessness with which the military planning of the Western powers is repeatedly troubled. The strategic concentration of the Soviets is no compromise between opposing concepts, but the best possible solution, whatsoever, of a preparation for action. It represents the best preparation for every conceivable defense and attack mission within the framework of the political aim of the Soviet Union.

Military Growth

Of course—and this is the reverse side of the mobility of the armed forces that has been referred to—the Kremlin has paid for this with an increase in power of the military which, at least, could not be bestowed on it without risk to domestic politics. Since 1952, the double-track nature of the Soviet military force has been done away with. All the Ministry of Internal Affairs Divisions, which formerly were under the control of the State Ministry for Domestic Security, have now been incorporated into the Army. As a result, the Army not only gained 16 elite divisions, but also an independence which it had not possessed before. In addition, the regional organization leads to the formation of at least subordinate officer corps of single nationality in their composition. Hence, not only has the Army become more independent, but within it, the individual army groups constitute, for the most part, independent groups, which in the long run, could develop individual leaders. However, to base any hopes of a Soviet collapse on these facts, would be wrong, at least as long as these forces are not faced with any severe and general crisis, or the Bolshevist system itself does not begin to totter.

Yet, peace depends mostly upon a small group of men in the Kremlin. This is one of the hard facts of international existence which we must accept. It is within the power of this small Soviet group to decide upon a shooting-war, to make such a decision secretly, and to make the initial attack with little or no warning. We cannot close our eyes to this fact. It will not go away simply because we hope that it will.

Actually, we are faced, even now, with *their* idea of war. The fact that it does not involve the massed onslaught of military forces does not detract from the fact that this is war today. Wars can be, and are, fought on the politico-economic, and the psychological-propaganda fronts as well.

Admiral Arthur W. Radford

A "Triphibious" Service?

Digested by the MILITARY REVIEW from an article by Colonel N. B. Tandan in the "Journal of the United Service Institution" (India) July-October 1953.

THE object of this article is to examine the need of raising a fourth service which would be called *The Triphibious Service*. The idea of such a service would be to provide a force capable of taking on operations of a combined land, sea, and air nature. At the same time, however, the personnel of the service would not remain distinct as Army, Navy, or Air Force, but would belong to one service.

A nation contemplating war goes to extreme lengths to bring to bear the maximum possible force at its disposal upon its enemy, and it is from this idea that the science of combined operations has been evolved. In 1759, when General Wolfe captured Quebec, the success of the entire operation was due to the close support given to his ground troops by the Navy, which had succeeded in sailing up the St. Lawrence River without any navigational aids as these had been destroyed by the French.

Pitt, in secret instructions to General Wolfe and Admiral Saunders, charged them, before the expedition set out, to offer each other the utmost "good understanding and co-operation." He instructed the soldiers to man the ships when they could be spared from land service and the sailors and marines were ordered to assist the land forces to man the batteries whenever the occasion arose and when they could be spared from sea service. These are some of the earliest examples of combined operations where more than one arm of the service had been used to achieve the goal.

On wars of today, Mr. Louis Johnson, former Secretary of Defense of the United States said, "Time and the complexity of modern war now make necessary the development of a higher loyalty, over and beyond a particular branch of the service —a transcendent loyalty to a national defense grand strategy which at times compels concessions on the part of each for the welfare of all. There is imperative need for teamwork. Neither the Army, nor the Navy, nor the Air Force can win a war alone."

Combined Operations

Before discussing the necessity for the existence of a triphibious service, it would be well to study the background which has indicated the feasibility of there being such a service. The idea has undoubtedly emerged from the extensive use during World War II of combined and amphibious operations. *The Royal Air Force War Manual* states the following about combined operations:

"The three services have now become interdependent to such a degree that it is virtually impossible for any one of them to fulfill its primary role without support by the two sister services." It further states: "Each service, therefore, requires the support of one or both of its sister services, even when pursuing its own characteristic strategy. To this extent all operations of war are, in essence, combined operations."

In a modern war, this definition is unquestionably correct. Today, no operation is possible without the co-operation of the air forces who have the task of initially "softening up" the enemy and then giving close support to ground troops. Similarly, to revert to the last war, the reoccupation of Europe could not have been achieved without the combined effort of all the three services.

Broadly speaking, the very war itself was a gigantic combined operation. Germany visualized that the task of winning the war lay in her ability to prevent Brit-

ain from being allowed to build up her war potential. To this end she employed vast numbers of submarines to prevent Britain obtaining raw materials from overseas. She determined that speed in the conquest of Europe was the next essential. The methods, which Germany applied in conquering a country on the continent, were similar in every case. First came the bombing by the *Luftwaffe*, followed closely by the mechanized assaults of her *Panzer* Divisions, and finally the occupation and exploitation by infantry. We find, therefore, that her entire strategy hinged around combined operations. The war in Europe precluded the active support of the Navy since operations were over land, but the German Navy was indeed actively supporting the Army and the air forces by striving to gain control of the Atlantic. On no occasion would the German Army ever attack unless it was assured that it would receive the closest support of its air force, upon which principle revolved the entire strategy of modern warfare.

Amphibious Operations

The necessity to reoccupy Europe after Dunkerque brought the realization that the science of amphibious warfare would have to be developed to such a degree as had hitherto been inconceivable. Germany was strong and the allies would have to be stronger still to be able to make a landing in Europe and thereby ultimately vanquish the enemy. That the assault would have to be an amphibious one was in no way doubted, even by the most casual observer, and it was to this end that the buildup of men and equipment began to take place.

To recapitulate an account of the amphibious landings in Norway and other parts of the globe is not the object of this article, but they do bring home the fact that they all were combined operations by the three services. The Army had to be trained to be able to make an assault landing on the enemy beach, the Navy had to be trained to co-ordinate the landing of the men at the right place and the right time, while to the Air Force fell perhaps the most exacting task of them all—to disorganize coastal defenses and reserves by strategic bombing, to clear the sky of enemy aircraft, and also to be on hand when required to give close support by strafing or bombing of any immediate obstacle in the path of advancing troops.

Multipurpose Troops

World War II brought the inception of innumerable organizations which required certain types of troops and formations to be developed for roles of a specialist nature. These troops were required to be more than just soldiers, sailors, or airmen. They had to be a combination of all three, owing to the fact that the tasks which were allotted to them consisted of the functions of one or the other type of service. A few of these groups were the commandos, the airborne troops, the long-range penetration groups, the naval brigades, and the glider pilots.

All these organizations were, however, but a small portion of the entire armed forces, which remained basically unchanged. The specialist troops were used at a specific time for a specific purpose. Their task was exacting but, on the other hand, limited.

The commandos were required to carry out offensive raids—in most cases amphibious—on enemy territory with a view to harassing him into the belief that a major attack was to follow. They were required to carry out their task speedily, and return with the least possible delay to their home bases.

Similarly, long-range penetration groups were required to operate far behind the enemies' lines, harassing his communications and moving away as soon as possible.

The possibility, however, of converting the whole of the armed forces into "spe-

cialist" troops, while it may have been considered, has not been put into operation, and specialist bodies have remained small in number.

A Triphibious Service

The definition of such a service could be taken to be either of two. It may be conceived that a fourth service could be established wherein the personnel would be so qualified as to be able to fulfill the roles of the Army, Navy, or the Air Force, whichever is desired or necessitated by the type of operation. On the other hand, it may be considered that a triphibious service could be organized along the lines of a task force, having within itself elements of the Army, Navy, and Air Force. These are ideas only and the possibility, practicability, or otherwise of such a service requires detailed examination.

Presuming that a fourth service is to be organized along the lines of the first definition—having one set of men who may fulfill the combined roles of all the three services—the problem of organizing such a force appears to be a tremendous task. First would come the selection of the men who would comprise the service. They would naturally have to be, every one of them, hand picked, having qualities which would render them suitable for all three roles. This would undoubtedly be a most difficult selection to carry out. After the selections have been made, there would then be the necessity for prolonged and extensive training of these men. The question of equipment and instructors will also have to be met immediately.

The selection of a man for a particular service, although difficult, is feasible. Consider, however, the responsibility of having to select a man who is not only to be a good fighting soldier, but also, possibly, a pilot, and one able to navigate and sail a ship, be it small or large. The clear-cut aim is no longer there and the man has to be able to perform all three roles equally well and at any time required of him. As to the man himself, he would obviously have to be young and intelligent—but how young? He has before him a long and arduous period of training and when he emerges from that training, he should still be at an age where his mind continues to be flexible. During the last war, it was considered that the ideal age for a fighter pilot was between 19 and 23 years. Would the triphibious man, having passed that age, be no longer suitable for one of his roles, or tend to deteriorate in his efficiency in that particular role? Similarly, the Navy strives to obtain its future officers at an extremely young age—16—and so trains these boys as to ensure that by the time they are old enough to be commissioned officers, they have been brought up, educated, and molded into the type of men most suitable to be naval officers.

The Army with all its multitudinous arms and services creates yet another problem in the selection of this "all purpose" individual. A capable gunner is not necessarily an efficient mechanic or communications man and this might well be true for all the other branches, such as the infantry or armored corps. There is a great deal of truth in the adage, "Jack of all trades, master of none."

In India, the problem of selection of personnel would indeed be complex. The normal uneducated peasant as recruited into the Army today, would not be suitable and hence it would be necessary to recruit at an early age and develop an extremely high standard of education.

Training

Presuming, however, that a suitable man has been selected for the role of a member of a triphibious service, the duration of the period of training adequate to efficiently equip him for the performance

of his various tasks will have to be considered. If it is decided to train him separately, one role at a time, it may well be that having mastered the art of being a good soldier and sailor, and having reached the stage of undertaking training to become a good airman, he may drop in his standard of efficiency as a soldier. Psychologists have proved, and indeed it is common knowledge, that the human mind reaches a state where retention of knowledge acquired is at its peak, but as time goes on deteriorates gradually. This factor of retention of knowledge will have to be carefully borne in mind in order not to allow the triphibious serviceman to relax in his efficiency as an all-around fighting machine. It is obvious that the man himself will be under a considerable strain, both during his period of training and in his continued service. The period that this man could be allowed to remain an active member of such an organization, and having completed that tour of duty, whether he would be able to fit into the normal role of either a soldier, or a sailor, or an airman, will have to be examined.

Equipment

The equipping of such a service would undoubtedly be an expensive and extremely difficult process. It would have to be provided with all the arms and equipment of a normal infantry division; it would also have to be provided with aircraft, together with all its administrative setup; and finally, it would have to be allotted its own flotilla of ships or boats, either for an amphibious landing or a slightly more prolonged sea voyage, which may have to be undertaken prior to the launching of an operation.

There would arise the acute administrative problem of the care and maintenance of all this varied equipment when the force itself may be engaged in only one particular role. Would it, having carried out an amphibious landing, leave its boats anchored offshore to be cared for by someone else, or would it have to deplete its strength by the numbers required to look after its flotilla? The same problem will also apply for its aircraft and ground warfare equipment.

Advantages

Although it is realized that such a service presents tremendous administrative problems, there are undoubtedly a great many advantages in the existence of such a force.

They are:

1. *Flexibility.*—The force could be switched from one role to another, depending on circumstance, without the necessity of having to call upon any other allied service.

2. *Striking power.*—Such a force would be able to take on operations of a much more intricate nature than would normally be possible by a combined effort of all the three present-day services. This is true because they would not only be able to mount the operation itself, but also to continue to pursue it for an indefinite period of time without having to rely on the continued support of one of the other services.

3. *Compactness.*—A normal infantry division is equipped with a percentage of supporting arms such as tanks and artillery. It is self-contained in its ability to wage war on ground, but requires the added support of aircraft and possibly the Navy to carry out bombardments of shore installations. It is much more advantageous to have all this support readily available whenever required within one's own force.

4. *Mobility.*—This is self-explanatory. A force so equipped could be moved from A to B at will without the necessity of having to work out detailed requirements

of ships, aircraft, and vehicles necessary for the move.

Disadvantages

As is the case with most new ideas, the possibility of a triphibious service presents glaring disadvantages which seem to outweigh the advantages. Some of the disadvantages are:

1. *Unwieldliness.*—The administrative tail of this service would necessarily have to be extremely large and the equipment allotted to the force would also be of vast bulk. There is bound to be some timelag when the men who have been operating the ships or boats have to change over and become tank drivers or prepare themselves to carry out a beach landing in the role of infantry.

2. *Personnel.*—As indicated in preceding paragraphs, the selection of personnel for the force will undoubtedly be the greatest problem facing commanders. The selection will have to be very carefully carried out and would necessarily entail considerable time. The physical and mental standard required of the men would be extremely high.

3. *Training.*—During the last war, when urgency demanded that officers and men for one or the other branches of the service were required to be produced as quickly as possible, the basic period of training was as follows: officers of the Army required 6 months; a trained pilot was produced after a period of 9 months; while the direct commissioned naval officer had to undergo training of approximately 10½ months. It follows, therefore, that a man who has to qualify to be a member of a triphibious service would require a period of training of not less than 2 years. This training during wartime would be too lengthy and defeat the purpose of producing such a force quickly to meet the circumstances which warrant its existence.

4. *Equipment.*—Equipment as used by all three services would have to be provided to the force. It may be drawn from existing stocks or from the three services, themselves. On the other hand, it may be considered that a force so organized might need special types of equipment which would be lighter than that which is provided normally. Thus, aircraft might only be of the lighter type and ships of a large landing craft pattern.

Whatever the type of equipment, its provision would be an extremely expensive affair and this fact would have to be weighed against the value of the actual force itself.

5. *Miscellaneous considerations.*—A triphibious force, once organized, would naturally be used in such a manner that the maximum number of roles which it could perform would be brought into operation to gain the maximum advantage over the enemy. In this respect, two of its main roles are dependent on the type of operation and the state of the weather. To clarify this further, two main roles which would have limited function would be that of the Navy and the Air Force. If the operation is taking place over land, then the need for naval support would not arise. If the fighting is at close quarters, the value of the Air Force would be limited.

The second factor of "weather" is of primary importance. The very word triphibious gives the impression of an amphibious combined operations force, and combined operations which take the form of amphibious landings on enemy territory are, virtually, at the mercy of the weather. Many an operation of this nature has been completely ruined by the state of tides and poor visibility at sea.

This would leave, then, the sole remaining role which could be performed by the services and that is the one of ground troops. This would mean that full value from such a force would not be obtained.

Practicability

The first consideration should be to determine the strength of the service. This would have to become the basis of all plans which would be laid before the force actually takes shape. It might be possible to work on the idea that the force should, as was the intention of Earl Mountbatten of Burma, take the form of a standard division so designed as to undertake practically any type of operation—jungle, amphibious or airborne. To this normal division organization would have to be added a proportionate increase in personnel capable of manning the service's flotilla of ships and fleet of aircraft. It would also have to have an organization which would enable these additional elements to be employed as ground troops, should it be necessary. The ground troops, themselves, might have to consist of a fair proportion of personnel which could be switched to either the naval or air side of the service. As mentioned earlier, once the force was actually launched on an operation, and also presuming that the operation was one which entailed a seaborne invasion, the fact that the ships would have to be cared for after the battle had moved inland would also necessitate depleting the force of a certain number of personnel who would be left behind for this purpose.

The air and land elements of the service would naturally continue to perform a dual role. The ships could be used to bring forward supplies and reinforcements and also arrange the evacuation of casualties and, as such, continue to play their role.

It is difficult to visualize such a service being a practical undertaking. It would entail risks which would have to be taken to prove or disprove a theory. Most organizations, no matter how perfectly planned, bring to light numerous and varied problems when put into practice.

A triphibious force might prove itself valuable under certain circumstances. For instance, for the type of warfare which was undertaken by the Americans in the Philippine Islands, a force of this nature which would be self-contained might well have been the answer. This type of service might also prove extremely useful in the event of a withdrawal where all its aircraft and ships would be available to evacuate the force in the quickest manner possible.

In spite of the possibility that this service might be advantageous under certain circumstances, it does seem that no part of the force would be at any time performing any particular task that could not be carried out by the co-ordinated effort of the present-day three services. The Air Force could be obtained in whatever strength necessary and for any purpose—strategic bombing or close support; the Navy, as it did in the last war, can well be relied upon to convey ground troops to their destination; and finally, the ground troops themselves could be trained, as they were, to carry out assault landings from landing craft.

While the formation of a triphibious service might well be possible, it is not essential. The gigantic landings carried out by the allies in Normandy in the last war proved beyond a shadow of doubt that well planned combined operations, with sufficient material backing to ensure a strong initial thrust and with a rapid buildup later on, could undoubtedly defeat the strongest enemy force. The troops used for the actual landing were ordinary infantry soldiers who had been given the additional training in assault landings. As is well known, they performed their task exceedingly well.

The Air Force, in such vast numbers as could not have been conceived at the beginning of the war, so paralyzed the system of rail and road communications in France and Germany, that the enemy was unable to bring up the necessary reserves of men

and material to meet the invasion. In addition to this, they virtually cleared the sky of all enemy aircraft and were readily available to render any assistance required by the ground troops.

The Navy in hundreds of ships of all shapes and sizes carried out the initial bombardment of coastal defenses and also put down the troops at the specified beaches, after which they continued to render fire support from the sea.

The invasion was made possible by an organization set up under one supreme commander who was responsible for ensuring that the entire co-ordinated effort would be launched at the precise time specified. No greater achievement has ever been recorded in history and the fact that the allies did win the war, bears proof that such an organization, even though the commitment was so great, did work magnificently. It would appear that had a similar invasion been carried out by several units of a triphibious service, the co-ordination of the naval and air elements of all these units would have presented a far greater problem than that which faced the supreme commander. It is, therefore, considered that the formation of a triphibious service would not be practicable unless it is for a very definite purpose and for a very restricted type of operation.

Alternatives

When the definition of a triphibious service was given, it was said it could be either of two; the second being an organization similar in pattern to what the Americans called a "task force." A task force could be of any size but, generally speaking, it was built around a naval aircraft carrier with its supporting battleships, and these ships carried an element of ground troops who, when put ashore, captured and held the objective. The naval ships and aircraft carrier were there for support and the task force was normally under the over-all control of the senior naval commander.

Such a force, although welded into one organization, retained the individuality of each component service, and at no time was there the suggestion that personnel comprising the task force should cease to belong to their own service. The reason for this was that the existence of the force was only temporary; they were organized to perform a specific task and, having carried out that task, returned to their parent service. This organization worked admirably. The responsibility for raising or nominating a task force lay with the chief of combined operations and the activities of these various task forces were termed combined operations, which in fact they were. If a fourth service is to be raised at all, it is considered that it should not be one which is always in existence but should have the nucleus organization in the way of a staff headquarters capable of setting up such a service when required.

Task Force Advantages

1. *Training.*—A short period of combined training of the personnel of the three services would suffice, and rapid expansion in war would be possible.

2. *Individuality.*—Personnel, arms, and services taking part retain their individuality and this will foster loyalty to the parent arm or service.

3. *Weapons.*—Weapons supplied to the three services can be used by a task force and no provision for special weapons is necessary.

4. *Flexibility.*—Any service or arm forming part of a task force would be capable of being switched over to the parent service.

Task Force Disadvantages

1. *Concentration of arms.*—It is always undesirable to concentrate all one's force in one direction. Consider a task force

at sea and under attack. The loss of an aircraft carrier together with all the personnel and equipment carried would be almost irreparable.

2. *Vulnerability.*—A group of ships at sea always presents an attractive target for an air or submarine attack. A strong enemy might disorganize such a task force before it even reaches its destination.

3. *Composition and Cost.*—Presuming that a task force equivalent to an army corps is to be raised, the following is a suggested composition:

Army, two infantry divisions with supporting arms and services.

Navy, aircraft carriers 2, destroyers 2, frigate/sloops 3, minesweepers 3, landing craft capable of moving a combat team (4000 men), as required.

Air Force, transport squadrons attached in support 2, fighter squadrons attached in support 3.

Bearing in mind that the initial cost of raising an army corps is an extremely expensive proposition, a task force composed as above is likely to cost the taxpayer a tremendous sum. Hence, it is evident that the need for the force would have to be great to justify such an expensive undertaking.

4. *Utility.*—A very important factor to be considered before a standing task force is raised is its usefulness during a war. It is felt that in a conflict lasting 4 to 6 years the task force, as such, is not likely to be used more than half a dozen times at the most. Is it then worth while bringing into being a force of this type?

Pattern of Future Wars

Toward the end of the last war, there came into being two weapons which, when fully developed, would undoubtedly change the entire pattern of wars as we know them today. These two developments were: the guided missile with jet propulsion, and the atom bomb.

Jet propulsion, first put to practical use in the last war by the Germans in the form of guided projectiles, brought about the development of jet fighters by the allies and immediately quickened the tempo of war in the air. Although by no means fully developed even today, the jet airplane has opened up untold possibilities for transport, bomber, and fighter aircraft. It is capable of very high speed and, when finally perfected, might, to a great extent, replace the ship as a means of transport. The Berlin Airlift is an example of what can be achieved by a well-organized system of air transportation. With the development of atomic energy as fuel for aircraft, transportation by air may become the major, if not the sole, means of transportation in the world.

The atom bombs dropped on Hiroshima and Nagasaki which most certainly brought about the surrender of the Japanese, revealed yet another possibility, that large ships being extremely vulnerable to air attack might well be outmoded as transport and fighting vessels.

Conclusion

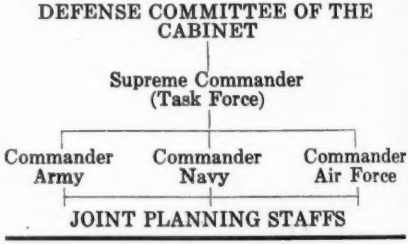
1. *General.*—The possibilities of the creation and development of a triphibious force, in the light of experience gained in combined amphibious operations and also bearing in mind what might occur in the future, have been taken into consideration in this article. It is felt, however, that the necessity of raising a triphibious service would depend on the point of view of each country. Any nation going to war would naturally prefer that war to be fought on somebody else's homeland. In the main, should India be involved in any form of global war, it is probable that her effort in that war would have to be conducted outside India. This immediately brings the realization of the necessity of our hav-

support and the task force was normally in one direction. Consider a task force

ing both a strong Air Force, capable of transporting airborne troops, and a strong Navy and a Merchant Marine, capable of transporting ground forces to the country where the war is being waged. This moving of our forces overseas would entail from the very beginning, the combined cooperation of land, sea, and air forces; therefore, it is considered that there is a requirement for an organization capable of co-ordinating the effort of all three services with the least possible delay and confusion. This organization should take the form of a combined staff under a chief of combined operations and should exist both in peace and war. A triphibious service in the sense of having one body of men capable of operating on land, sea, and air is not practicable.

To unite the efforts of the three services for a single purpose under the control of one organizing staff is unquestionably both practical and desirable. The word triphibious may be used to replace what we now know as combined or amphibious operations, or it also may be taken to include all of the armed forces which may be known as a "Triphibious Service." In this respect, General Omar N. Bradley says, "My experience as part of the unified command in two large-scale triphibious invasions has taught me that each service benefits directly from the advantages of the others. And similarly, that each service suffers directly from the limitations of the others. None is effective without the other."

2. *Recommendations.*—After considering the points mentioned, my recommendations are: that a triphibious service, as such, need not be raised but a joint planning staff under the direction of a Supreme Commander, who would actually conduct the operations in war, should be established. A suggested composition is as follows:



A small nucleus task force consisting of personnel of the Army, Navy, and Air Force be raised.

Plans for expansion of the task force to a strength equivalent to an army corps be drawn up with a view to assessing expense as against practicability.

Dedicated to security, our military establishment must be equal to whatever task it may be called upon to do.

We must have better, faster, more far-ranging planes than any possible enemy.

We must have the finest in ships and submarines, equipped with superior electronic detection and fire-control gear.

Our soldiers and our marines must be better armed and better protected than any which might be sent against them.

We must be prepared to fight on the land, in the air, on the sea, and beneath it with more capability than any other nation on earth.

To implement this objective, above everything else, we need men of the highest quality of character, leadership, and technical competence.

Deputy Secretary of Defense Robert B. Anderson

The Shape of War to Come

Digested by the MILITARY REVIEW from an article by Marshal of the Royal Air Force Lord Tedder in "Air Power" (Great Britain) Winter 1953.

I HAVE no doubt that among the readers there are very differing views regarding Oliver Cromwell and his activities. Nevertheless, I imagine that most people will agree that his instructions as to putting trust in God and keeping powder dry were good morally, politically shrewd, and from a military point of view wise.

There are, of course, some people who hold that trust is all that is needed and that to have any powder at all is unnecessary and indeed wrong. The trouble about such a policy is that in actual practice it would mean trust, not in God, not even in other nations, but trust, unsupported trust, in the individual politicians who happened to be in power in various countries. I am afraid that in this world of ours such a proposition needs no comment. The fact is that, despite all the hopes which buoyed people during the trials and horrors of the late war, the world has been forced, regretfully and bitterly, to the conclusion that the law of the jungle still rules, that security without strength is a mirage, that, in fact, weakness invites and indeed provokes aggression.

National Strength

Now strength, national strength, is, of course, not solely a military affair; it is a complex of moral, political, economic, and military factors, and weakness in any one direction may be fatal to the whole. One must never forget that these varying factors are closely interrelated, but it is mainly from the military point of view that I want to discuss this problem.

Nevertheless, the first point one must make is, necessarily, a political one. It has been said before—and it cannot be said too often and emphasized too strongly—that the military strength which the free world has felt it necessary to build has one prime objective—to prevent another war. It is questionable whether the two world wars or indeed the Korean conflict would ever have occurred had it not been for political and military weakness which misled the aggressor into thinking he could get away with aggression without any serious fighting. There must be no room for doubt in the future. It must be made clear to all that the free nations have the will and the strength—the military strength—to resist aggression, and that strength must be such that it will be clear without a shadow of doubt that aggression will not pay. The would-be aggressor may well try to bluff—that has been the usual technique—but there must be no bluff about the defense: it must have real strength, strength of such a nature as to force a potential aggressor to think many times before even risking a war. Under present conditions, it is only in this way that we can have any reasonable certainty of *preventing* another war. I repeat, our object is to secure peace, not by winning another war but by *preventing* another war.

How to organize the collective defense of the free world, to develop and maintain the military strength of a voluntary association of democratic nations who by their very nature abhor war, is no simple problem, and is not made easier by the fact that expert military opinion is apt to be divided on the subject. What form should the military strength of the free world take? In the first place, I suggest that the military forces must be such as to constitute an effective deterrent, that is our primary objective; *but*, they must also be such as to be able to fight a successful war *if* the deterrent fails. One must, therefore,

try to foresee what would be the nature of another war. It is sometimes said that the so-called principles of war do not change—insofar as human nature does not change that is probably true. But the shape of war has been changing drastically during this century, and I believe we would be making a fatal mistake—and I mean fatal—if we were to shape our forces on the basis that a war in the future would be on the same lines as those of the last war. War having in the old days been a matter of formal battles and developing in World War I into a struggle for lines, the tragic mistake was made before 1940 of preparing for a repetition of the struggle for lines. I hope the bitter tragedy of the Maginot Line and the lesson it affords will never be forgotten. In any event, during the last war it was the war in the air—unforeseen by many and still not understood by some—which was largely responsible for changing the shape of war: the war became one of areas. It might well be that a future war would be one of continents.

Possible Aggressor

So far, I have deliberately left the possible aggressor anonymous, but it is no use burking the issue that unless and until the new regime in Moscow (or its successor) clearly by word and by deed renounces the Stalin aim of world domination, the potential aggressor is in fact the Soviet Union.

That fact poses specific problems. All the North Atlantic Treaty Organization nations (and particularly Great Britain) depend on seaborne supplies and are, therefore, vulnerable to attack at sea; all, and again especially Great Britain, are vulnerable to attack from the air; all the continental nations are open to attack by land over the relatively short distances from Soviet-occupied territory.

What does this mean? Does it mean that we must in peacetime build and maintain massive armies with all their supporting air forces on the Continent of Europe on the scale which it took 4 years of the combined British and American nations to attain? Does it mean that during peacetime we must again build the vast numbers of ships, vessels, and aircraft we had in 1944 to secure our sea communications? Does it mean that every nation must build air defenses—the great network of communications, antiaircraft, and fighter defenses—which proved to be necessary in the last war?

I suggest that to attempt to build military strength on these lines would be not to provide a deterrent to aggression but to bankrupt the free world and hand it over to communism and chaos without a blow. Yet, military power we must have, defenses we must have.

Let us look at the other side of the picture. The Soviet's seaborne supplies are negligible and against her our traditional weapon of naval pressure is virtually innocuous. The history of Napoleon and Hitler should be sufficient proof of the folly of attempting land invasion of those vast areas. Only from the air is the Soviet Union open to attack. There is the problem.

The Bombers

I have no simple solution, but I do think we tend to make the problem unnecessarily difficult by failing to consider it as a unity. There is still a tendency to regard the war at sea, on land, and in the air separately—defense of sea communications being a matter for naval ships and carrier-borne aircraft, the land campaign a matter of divisions (with, of course, supporting tactical aircraft), and air defense a matter of antiaircraft radar and fighters. For some reason which defeats me, many people forget or ignore the other force which in the last war proved to be the one common factor and did in fact

unify the operations in the three elements —the bomber force. The impression seems to have been aired about that the bombers were a slightly disreputable party that burned German cities to no real purpose. It is forgotten or not known that the bombers played a vital part in limiting the production of submarines, and that the waters around Denmark were littered with German shipping sunk by bombers' mines —including the end of the *Tirpitz*. It is forgotten that it was the bombers that were mainly responsible for strangling Rommel's army, that it was the bombers that knocked the *Luftwaffe* out of Sicily and made the entry into Southern Europe possible, that it was bombers that strangled the communications in Northern Europe, starved German transport, and grounded the *Luftwaffe* for lack of fuel, and made Operation *Overlord* possible. It is forgotten, or not realized, that after the first round of the Battle of Britain had been so gallantly fought in 1940 and 1941 by the day and night fighters, it was the bombers that pushed the air war away from British skies to be fought out and won over Berlin; it is forgotten that it was the bombers that delayed the *V1* and *V2* attack for vital months, reduced it to an unpleasant nuisance, and were the *only* antidote to the *V2*.

I emphasize all this about the bomber, the offensive component of defense, because I feel it is absolutely essential to remember that purely passive defense with no offensive element is, in practice, no defense at all. The noble art of self-defense would be a pretty ineffective business if the boxer had no straight left or right hook. In 1944, the Germans were producing (at the expense of their bomber production) more fighters a month than the total British and American production—they were losing the air war.

I also emphasize the bomber for two other reasons. First, I feel that it is only by making proper provision for utilizing the immense potentialities of the bomber that requirements for pure defense, for the war at sea, on the land, and for close air defense can be kept within any reasonable financial bounds. Second, it is the bomber and the bomber alone that can, under present conditions, provide the essential offensive element of our defenses and act as a real deterrent.

Living in the Past

I can imagine you may be thinking that I am falling into the error which I have myself denounced—living in the past. It has been suggested that what has been called push-button warfare is just around the corner and that fighters are already obsolete. I would not venture to prophesy what may or may not be possible in 10 years' time, but I do know that there is a long, long timelag between a successful theory and its general application; that gap is inevitable; we do not want to fall into it. There have been spectacular advances in aircraft performance; there may well be further advances yet to come; by and large those advances tend to aid the bomber as against the defense—although the guided projectile may find its first use to help the fighters solve a problem which gets more and more difficult. All the indications are that in the immediate future it will be more true than ever that the bomber will get through.

Atomic Weapons

And that brings me to what is, I feel, the crux of the entire problem—the atomic weapon. There are, of course, people—very sincere people—who would ban its manufacture or use. The armored knights of old wanted to ban the use of gunpowder. I can understand the Soviets proposing that it should be banned, since it is the only effective counterthreat which the Western Powers can wield as a deterrent.

On the other hand, I believe there are very few people in this country who have more than the vaguest idea as to the fearful potentialities of the atomic weapons now within sight. It is no Jules Verne story to say that war with these weapons might literally destroy European civilization. I am sure I am not being an alarmist in saying this. I believe this to be an accurate, cold statement of the actual possibilities now ahead of us. I only regret that we, in this country, are not given more of the facts. If our American friends can face up to them, surely we can, and if we were on an equal footing with them in public awareness of the subject, I believe we might be of value to each other in arriving at a balanced judgment as to what action to take. I have seen reports that the American authorities are seriously considering putting the bulk of their defense efforts into passive air defense against atomic attack. With all respect to the experts who may have given that advice, I, myself, believe such policy would be a fatal mistake. I frankly do not believe such defense could be really effective even at a cost which would—or at least should—be prohibitive even for the wealthy United States. I also believe that to adopt such a policy would greatly increase the risk of war and of atomic attack, since the deterrent afforded by the atomic bomber force would have been sacrificed. I am one of those who believe that for some 4 or 5 years after the surrender in 1945, aggression was averted by the United States atomic bomber force. I do not think that the fact that the Soviets have now developed their own atomic weapons really lessens that deterrent effect; the fearful counterthreat is still there.

This, then, is the major factor we must take into account in looking ahead. To my mind, it makes it more than ever essential that our aim must be to prevent war.

This may seem a pretty gloomy picture —the world divided into two armed camps with the contestants holding a pistol at each other's heart. But I believe there are real grounds for hope. A contest using the atomic weapon would be no duel, but rather mutual suicide—that is scarcely a prospect to encourage aggression. The development of the atomic weapon has brought the world face to face with the ultimate realities of war. Provided that the free nations make it clear, without a shadow of doubt or vestige of bluff, that they are ready and able to deliver the atomic weapon and willing to face that ultimate issue, then I believe that sanity will prevail. There was a time when it might have been doubtful whether democracies with their natural abhorrence of war and tendency to live in the present would have the solid judgment and the sense of responsibility to accept such an issue and its implications in peacetime. As it is, I think that one of the most remarkable developments in this uneasy postwar world has been just that —the growth of a real sense of mutual responsibility among the free nations, and nowhere more remarkable than in the case of the United States, despite their natural absorption in their own problems and their traditional distrust of external commitments. At the same time, I must make it clear that I would not for one moment accept the thesis, which has been put forward occasionally, that because atomic development is expensive, because atomic bombers are allegedly expensive, because the United States already has an atomic bomber force, Great Britain should leave this element of military power to the United States.

Conclusion

I believe that now and in the difficult years ahead our British experience and judgment in world affairs are and will be of vital importance to the world at large.

If we accept the position that the United States, loyal and stalwart friends though they are, are the sole arbiters in the atomic field, we should no longer be a great power, our influence would be negligible, and our ability to help lead the world would be lost.

No, in the scientific and technical, in the military and in the political aspects of the atomic world, we have a vital part to play. If we were to shirk that responsibility, I would indeed be gloomy: if we play our part, I have real hope, hope that we can show an example of courage and determination, patience and faith which will inspire the free world and give time for the fundamental human rights of freedom of speech and thought to spread their sway over the entire world, time for police states to become free, time for truth to prevail.

I agree with Cromwell on this issue: let us trust in God and keep our powder dry.

Streamlining the Infantry Division

Digested by the MILITARY REVIEW from an article by Major W. N. R. Scotter in the "Journal of the Royal United Service Institution (Great Britain) November 1953.

THERE has been a great deal of thought devoted during the past year or two to the question of cutting down the tail of the Army. We have frequently been told by senior officers, who should know, that our divisions are in danger of becoming immobile through too much transport. So far, we have seen a few minor cuts in the number of vehicles in the infantry and armored divisions, generally from the arms, which have made no real impression on the size of the problem.

With the present organization of field formations, it is difficult to see how we can streamline the tail much more. It seems to me that we have been going about the problem in the wrong way, and that it is time we examined our organization to see where the solution lies. Great strides were made during the last war in producing administrative machinery to support the fighting formations; but the fighting formations themselves have hardly changed at all in basic organization for a number of years. The fact that administrative units are there to produce what is wanted forward, and, therefore, must conform to the organization of the forward formation, has, in my opinion, always led us to look to the administrative services for change when we find we are losing flexibility or mobility. It is my contention that the time has come to overhaul the fighting formations and see whether they are organized as well as they might be for modern war, and to examine the organization of each unit and formation with a view to increasing mobility and flexibility; and then to discover how the administrative units and services can best support the organization.

In World War I, the Army was organized in fours. They *formed fours;* there were four of this unit in that formation and so on. We changed to *threes* almost throughout the chain of command. I presume the reason for this was that increased mechanization made it difficult for commanders to command more than three units or formations—understandable in the days when radio communications were fairly primitive. In the last war, when radio communications were much improved, we still retained the old *threes* organization generally, and in some cases saw one headquarters controlling only two subordinate units. There is a saying that

"one [headquarters] over one is a military nonsense." I suggest that with the present excellent radio communications, this maxim should be extended to include one over two, and that even one over three should be regarded with the gravest suspicion.

Before going any further, I should like to say a word about these cries of *threes*, *fours*, or *fives*. It is a symptom of loose thinking and dangerous to talk about an Army being organized on *threes* or *fours*, for it must be obvious that the numbers of units or formations commanded at each level should depend on the role, communications, command organization, and sundry other factors.

With the above premises in mind, let us start, logically, at the bottom and work up through the organization of an infantry division.

The Section

First the section—the smallest subunit—the men at the sharp end who actually *apply* fire to the enemy. We see the section now comprising a commander and eight or nine men with one light machine gun. Why this number of men? Because, say some, it is a nice number for a section commander to command, and is a small but effective party—also it divides nicely into threes, a light machine-gun group and two rifle groups. How often in battle does one see a section commander using his section in three groups? I think very seldom, first, because any section commander competent to control three groups under fire would soon be promoted out of the section, and second, because after a few weeks of war the section seldom has enough men to form these groups. Brigadier General S. L. A. Marshall, in his book *Men Against Fire*, after a most exhaustive research into the reactions of men under fire in the last war, reaches the rather disturbing conclusion that, in any engagement, the number of soldiers in contact with the enemy who actually fire their weapons is as low as from 15 to 20 percent. Note that this figure refers to men actually in contact, and does not include men in reserve companies and platoons. He also discovered that the proportion of men engaging the enemy could be as high as 100 percent within small subunits of four or five men because they could be influenced by the encouragement and example of their commander. The proportion of nonfirers becomes extremely high when the section contains as many as ten men. It is my belief, therefore, that the section should contain no more than five or six men consisting of a light machine-gun and a rifle group. Many times in the last war, the strengths of sections in my company dropped as low as five men without any appreciable decrease in fire power, but with a marked increase in speed in action through easier control by the section commander. Often in war, a platoon commander needs to detach a party of four or five men for a patrol, picket, post, flank protection, or other such task. With the section organization of ten men, he must split the section to do this, but with a section of five men he can detach an entire subunit under its commander with advantage.

In defense, particularly on a wide front, it is often necessary for a platoon commander to split sections in order to cover his ground by fire. So often it is found that ten men in one position cannot do the job, and the large section of ten then becomes two sections of five under two commanders. How much better to have your sections already organized for this ever-recurring situation? The small sections are easier to fit to the ground and increase the chance of covering the ground by fire. In attack, it is the small, compact party under its commander which can infiltrate enemy localities and maintain the momentum of the attacks. It is the task of the section in attack to bring its *fire* to bear on the enemy and thus defeat him. It is the

fire which counts—and not the men. Why, then, have a cumbersome party of ten men with a high proportion of nonfirers when a smaller, more easily controlled party can bring almost as much fire to bear, and when two such parties can produce the same number of men in the assault? In order to bring this fire to bear on the enemy, the section almost always has to be exposed to enemy fire in the attack. Why risk ten men under this fire when five can do the job equally well? They are less of a target and will sustain fewer casualties. In the present organization, one section pinned down in the open by enemy fire is one-third of the platoon out of action. This brings me to the organization I propose for the platoon.

The Platoon

The platoon, as presently organized, contains three sections, each of ten men, and a headquarters element with the platoon mortar and antitank weapons. To my mind the weakness in this, probably the most important fighting subunit, is that its organization does not permit the commander to make the best use of his 30-odd men. Three subunits in the platoon mean that if a platoon is advancing with two sections up, and these are stopped, only one section is left to keep the attack going.

Once this section is committed, the platoon commander has shot his bolt, and another platoon probably has to be brought in, with a consequent loss of time, in order to keep the attack going. In defense, with three sections of ten men, the platoon commander is always faced with the difficulty of fitting the sections to the ground, with the restrictions imposed by only having three light machine guns, to say nothing of his difficulties in creating any depth to his position.

My suggestion is that the platoon should consist of five sections, each of five men, as advocated previously, with the headquarters element remaining as presently organized. The advantages of this organization are that there would be a great increase in flexibility, allowing much wider scope for initiative on the part of the platoon commander and a considerable increase in fire power. A further advantage, perhaps not so apparent, is that reinforcements are likely to become efficient members of the platoon more quickly when drafted into a platoon with small sections, as they then become members of a small team whom they will quickly get to know.

It will be said that a platoon commander cannot command five subunits; but I contend that he can. In defense, his task will be no more difficult than before; while in attack, he should seldom, if ever, be spread out on a five section front and will normally have two or three sections in reserve. In all phases of war, his task should be made easier by the fact that section commanders have a compact section within their capabilities of command, and the platoon commander should not be having to rally constantly and lead sections (as he does today) which have, through their size and dispersion, gone beyond the control of their section commander. The training of his section commanders, which is quite a problem in a short service Army, should be made easier by the fact that they command a smaller section.

One problem which has not been discussed in this suggested organization is that of the supply of ammunition, in particular that of *Bren* magazines. This should, to a certain extent, be overcome with the introduction of the new lightened *Bren*, and if the new ammunition is lightened, the troops in the smaller sections should have very little more weight to carry.

The Company

My proposed reorganization has indicated a saving in manpower of about five men within the platoon. However, what I propose for the rifle company will mean a slight increase in the over-all strength.

During the last war, in Burma, my company was for a long time organized in four platoons. Admittedly, this was a special organization because of the nature of the country and the conditions, but it was found most successful. Four platoons are quite easy to command. They give a company commander infinitely more flexibility both in attack and defense, and require no increase in company headquarters strength. Five platoons in a company are, to my mind, too many. There is a popular theory that the company commander sits back and controls the battle on his radio; but, in fact, a company commander more often than not has to be right up with the forward platoons, to employ his company with maximum effect. Under such conditions, five platoons are too many to command. I would like, therefore, to see a rifle company of four platoons, each of five sections of five men—an over-all increase of only 16 men for each company.

The Battalion

The present infantry battalion organization of four rifle companies and one support company appears to allow flexibility without being unwieldy and here I would suggest no change. Many battalions organized on a three-company basis have found as a result of exercises since the war that this was not enough. Five rifle companies would, I believe, detract from the mobility and speed in action of the battalion, in addition to being difficult to command and control. The idea of five rifle companies, each with its own support element, and no support company might first appear attractive, but would obviously be unsound from the point of view of concentration and deployment of support weapons. My suggestion is, therefore, that the infantry battalion would continue to consist of four rifle companies and a support company, and the rifle companies to be organized as outlined previously.

The Brigade

I now come to the most contentious part of this article. During the late stages of the last war, the Germans were forced at times to group from five to seven battalions under a division headquarters, without any brigade headquarters. These divisions were switched from one area to another, and brought into action with alarming rapidity. Corps headquarters, controlling such divisions, were able to group very much faster than we, with our more cumbersome division organization, could manage to do. The lesson here, I think, is that the brigade headquarters is an unnecessary block in the chain of command, and absorbs a vast number of officers, men, vehicles, and equipment without contributing much to the efficient fighting of the battle. Tactically, the Germans found that success in attack could be exploited much more quickly by division headquarters controlling battalions without having to involve other headquarters.

In defense, co-ordination, counterattacks, and regrouping were more effective and more speedily carried out without brigade headquarters between the division headquarters and battalions. It seems, therefore, that there is a lot to be said for doing away with the brigade headquarters. Apart from tactical considerations, such a cut would save about 130 officers and men and 40 vehicles for each brigade headquarters (not including signal corps troops which will be discussed later)—a total saving within the division of about 390 officers and men and 120 vehicles.

The Division

Accepting the fact of a division without any brigades, we come to the question of how many battalions a division headquarters can command, and how many it will require to be effective as a division. The infantry division normally forms the basis of the tactical plan, and should be organized so that it can be adaptable to

all types of country and conditions, and able to maintain itself in contact with the enemy for long periods. Thus, if the fighting element of the division is small, the provision of supporting arms and administrative units and services for it make it too uneconomical and tail-heavy. When thinking of the reorganization of the division, we should try to provide an organization which can bring as many battalions to face the enemy as the present division, and also provide a reserve. A division of three brigades will seldom attack with more than two brigades forward. Thus, division objectives are seldom larger than the capabilities of a four-battalion front. The same is true, to a certain extent, of the defense, depth and reserves being furnished by the third brigade. It is apparent, therefore, that the division must contain not less than six battalions and not more than the present nine. To narrow this figure down a little, I think we can accept the fact that six battalions are too few to allow for reliefs, and would not allow much flexibility on a four-battalion front. With three brigades in a division, nine battalions are necessary so that each brigade may have a reserve; but the removal of brigade headquarters would do away with the necessity of reserve battalions at two levels, making it possible to reduce this figure. My conclusion is that seven or eight battalions are required. A division commander would probably rather have eight battalions; but is the division headquarters capable of commanding this number? In certain circumstances, such as static defense, the answer is obviously yes, but for more fluid operations I think it would be straining things a little, and so my preference is for a division of seven battalions.

The command and staff organization required by a division headquarters commanding seven battalions is difficult to detail, but I cannot see that it should be much different from what exists at present. It is certain that the headquarters will be required to split into main and rear, and, I think, equally certain that a tactical headquarters should be capable of operating, however much this be frowned upon in the present organization. A further suggestion is that each division should have a second-in-command (brigadier general) who could be used by the commander to coordinate parts of the division battle if and when required. The second-in-command would probably need an operations and intelligence staff officer to travel with him. This, together with an increase of four officers in the G Staff, would mean a total increase of seven officers in the division headquarters.

Supporting Arms and Services

The organization of the supporting arms and services to support the seven battalion division is one that I cannot decide, theoretically, but there is no doubt that the arms and service experts could produce what is required, and suitably modify it after practical trials. It seems to me that the fact that all battalions in the division would be commanded by the one headquarters should permit centralization of control of supporting arms and services, and also for concentration and economy.

The division Royal Armored Corps regiment would still be a very necessary part of this division; but there would be no brigades under whose command squadrons could be placed, and the commanding officer of the regiment would, therefore, be in a much better position to co-ordinate the antitank layout of the division sector as a whole.

As an infantryman, I should hate to see the number of field guns, antiaircraft guns, and mortars in the division artillery reduced, and I do not see any reason why it should be. Batteries could still be in direct support of battalions, and each regiment could be placed in support of the battalions which it could best support, the

entire organization being co-ordinated by the artillery commander.

As an entire division battle would be fought from division headquarters, it seems to me that the artillery commander would be better able to control and concentrate his guns more effectively.

In the seven-battalion division, the engineers would no longer have to fight against being placed under command of brigades. Centralization of control would be easy for the engineer commander. The tasks of the engineers would be unlikely to decrease, except on road maintenance, and I suggest that they should retain their present organization.

The division signal corps troops, in dispensing with the brigade signal corps troops, would make a saving of about 6 officers, 200 men, and 55 vehicles. It is possible that allowing for the retention of signal corps troops required to provide rear links to battalions, including the requisite linemen and dispatch riders, the total saving in manpower to the division would be the equivalent of 2 brigade troops, or about 4 officers, 140 men, and 35 vehicles, plus any additional savings made by reductions in the service units.

The Royal Army Service Corps would be well able to adapt themselves to the seven-battalion division, as their *brick* system of building up support makes their organization very flexible. I estimate that, with reductions throughout the division column caused by the loss of three brigade headquarters and two infantry battalions, they should be able to save at least the equivalent of one transport platoon, that is about 60 officers and men and 35 vehicles. This is a rough estimation, and a more correct figure could only be obtained after a very detailed study of tasks and tonnages.

In addition to the above, there could be cuts in the number of both men and vehicles in the other branches to conform with the new organization.

Conclusions

I have tried in this article to show how I think a standard infantry division should be reorganized to enable it to become a more effective fighting force, and to reduce the manpower, vehicles, and equipment required to maintain the present cumbersome and tail-heavy formation.

A rough estimate of the number of men and vehicles required for the seven-battalion division shows that, taking into consideration the loss of two battalions, the slight increase in battalion strength necessary to increase rifle companies to four platoons, and the cuts in the supporting arms and services, it should require approximately 2,200 officers and men and 430 vehicles less than the present standard division.

I have no doubt that these figures would be increased after a detailed study of the requirements of the supporting arms and services. In addition, there would be a large saving in arms and equipment.

The new division would be more mobile and, as the Germans proved, more flexible at all levels. By having light machine guns in the platoon the fire power at the sharp end would be increased and there would be no loss of artillery fire power. The division with this organization would, I believe, be easier to handle at all levels, and the quicker transmission of orders would naturally result in quicker reactions. Centralized control of all types of unit in the division would lead to economy of force and concentration.

There are obviously many problems of command, control, and support which I have not touched on in this article, but none is very formidable and it is certain that they could be solved in practice.

I would like to conclude with a plea that we should give this organization a trial by forming a seven-battalion division as soon as possible and trying it out in training. I am sure that the results would more than compensate for the effort.

River Crossings--Attack and Defense

Translated and digested by the MILITARY REVIEW from an article by Major von Hopfgarten (former German Army) in "Wehrkunde" (Germany) March 1953.

FROM a study of river crossings, it was shown that two types of attack were most prominent: the attack, after moving into assembly position, against an enemy prepared for defense; and the attack from march column, as a rule, after a successful breakthrough of an enemy position lying far in front of the river obstacle. In the latter case, best results were most often obtained by surprise night attacks.

On the basis of experience gained from the decisive river crossings in the campaigns on the Eastern and Western fronts, including those of the allies, it is necessary to add to the rules for this type of combat a number of points which are not mentioned in the official principles of the *Tactical Command* of the former German Army.

New Developments

These addenda which, generally speaking, do not alter the basic principles of the German concept are necessary because of developments in armament as well as the employment of modern combat means and forces. They have reference to the following points:

1. *Operational.*—River crossings call for the combined employment of parachute, air-landed (glider-carried troops, and troops carried in transport planes), and armored forces; air superiority is necessary if a decisive success is to be achieved.

2. *Tactical.*—Combat command in night battles for river crossings.

3. *Technical.*—The employment of modern light artillery and recoilless antitank cannon.

The employment of new-type crossing equipment, such as amphibious vehicles and tanks. The construction of underwater bridges. The use of bridge equipment which shortens construction time and has a load capacity of at least 60 tons. The employment of and defense against remote-controlled projectiles directed against bridge sites.

On the basis of the following discussion and the examples from World War II, it is not difficult to draw conclusions.

The experiences of World War II, on both sides, show that nearly every attempted river crossing succeeded—but such was not the case, however, in reference to its immediate exploitation for an operational breakthrough. Of course, the fact must be taken into account, that the crossings, on the part of the enemy, were conducted with an unbelievable superiority in point of matériel, against German organizations which for the most part were exhausted from fighting. The reasons for the failure of operational breakthroughs, in most cases, were due to:

1. The helplessness of the attacker in the face of the defender's use of matériel, or lack or tardy use, of his aviation.

2. The pinning down of follow-up forces by the air force of the defender in spite of the rapid movement to the opposite bank of the attacker's heavy weapons.

3. The mobility of the defender in concentrating his defensive means (aviation, artillery, and tanks) which, during the crossing phase, could still be avoided.

4. The gradual stiffening of the defensive front in addition to mass counterattacks.

5. The continuing disturbance of bridge traffic and, thereby, the occasional cutting off of supplies for the forces in the bridgehead.

6. Unforeseen events as, for example, in the case of Arnheim, the accidental

presence of a German tank brigade in the landing area of the air-landed forces.

7. Sudden periods of bad weather which limit the activity of the air force.

Preparation

Experience shows that during the course of a unified, major attack operation, one must, to begin with, confine himself to the acquisition of a few crossing areas of operational importance. This requires, however, the launching of several river crossing attacks within a certain area. A good example of this, was the Meuse crossing of the Von Kleist armored group in May 1940.

Only the development of the situation reveals which crossing is suitable for the development of the operational idea. It will be necessary, however, in the special case of a river crossing to work out individual problems of a technical nature, in a more detailed manner as, for example, after the pattern of the allied nations in their crossings and landings. In this connection, a study of the *Overlord* plan will give us a great number of ideas.

In Europe, without air superiority, it will be necessary to make all preparations at night. This implies, in addition to thorough air reconnaissance, local instruction of even the lower commanders, and the use of aerial photographs for the attacking forces.

The main part of the preparations are to be made outside of the range of the enemy's artillery. When mechanized and motorized formations are used, there will be no loss of time.

The engagement of the artillery constitutes an exception. In an attack on a defended river line, the following solution is most promising of success: gradual strengthening of the artillery over a fairly long period of time (in the case of the Soviet Army, from 4 to 6 weeks); the establishment of numerous dummy positions which are to be occupied the night before the attack; cautious adjustment of fire with a few roving guns; at least 2 days before the crossing, a dense air and antiaircraft gun barrage is to be started; crippling of the enemy's rear area, especially of his artillery, by means of bomb carpets and of fighter-bomber attacks for about a week before the beginning of the attack.

Careful preparation is, basically, of more importance than the execution of the crossing itself.

An example on a high level, was the 2-year preparation for Operation *Overlord* with the beginning of the strategic bombing in the spring of 1944. This point is also to be considered, although on a reduced scale, in tactical operations whenever considerable enemy resistance is to be expected.

The following forces are desirable for a successful river crossing effort:

1. Parachute or air-landed forces (engaged the night before the attack).

2. Crossing forces (armored infantry riflemen or infantry, combat engineers, mortar, and antitank forces).

3. Security forces (antiaircraft artillery, artillery, and aviation).

4. Bridge construction unit (bridge column, engineer battalion, antiaircraft artillery).

5. Follow-up forces for the expansion of the bridgehead (armored forces, artillery, antiaircraft cannon, and armored infantrymen).

6. Reserve (infantry, engineers, crossing equipment, ammunition, and food).

Armament and Equipment

In addition to the forces required, the following armament and equipment will also be needed:

1. *Infantry.*—Automatic rapid-fire weapons, recoilless antitank guns and artillery, medium and heavy mortars, and a large number of small radio sets.

2. *Artillery.*—Numerical superiority in

number of cannon, with a large proportion of flat trajectory weapons, and rocket projector forces.

3. *Tanks.*—Amphibious tanks for the first and second waves.

4. *Antiaircraft cannon.*—Spotting possibilities with reference to remote-controlled projectiles.

5. *Engineers.*—Light crossing equipment, amphibious vehicles, rapidly operating ferries for medium tanks, underwater bridges for daylight traffic, and speedily erected bridge equipment for heavy tanks and artillery for night traffic.

In addition, planning should call for the following supporting weapons: reinforcing artillery in considerable amounts, light and medium bomber forces, and pursuit and close-support aviation. The choice of the time of the attack depends on the material superiority (existing or lacking) of aviation and artillery, without which, an attack in daylight is impossible.

More than in the past, night attacks from great depths, especially in the case of armored formations, will be the rule in surprise-type attacks against a weak enemy.

In the future, the construction of the bridge can be effected at night only. In the case of powerful enemy air and artillery action, this will be impossible, under normal conditions, during daylight hours. In case the situation requires the use of the bridge during the day, the bridge site is to be well concealed by smoke.

The time interval between the construction of the bridge and the crossing is to be based on the following considerations:

How long will the crossing forces be able to hold the bridgehead without armored forces, support by aviation, and artillery?

Since the construction of the bridge cannot be started until nightfall, the start of the attack should be advanced accordingly. As a rule, either the morning or the afternoon is the best time for it.

Tactically, the following principles govern the crossing:

1. Period before the beginning of the attack:

Several hours of concentrated fire by artillery and aviation on the enemy's heavy weapons. About one-half hour before the crossing, destructive fire by the artillery on the forward enemy positions, and further counterbattery fire.

Shortly before the crossing (around 15 minutes) bomb carpet on enemy positions and the crossing site.

2. Time of the attack:

Rolling barrage in bounds which, from the standpoint of time, are long, but from the standpoint of terrain, are short. The first and second waves of the crossing force reach their own bank with the light crossing equipment during the time of the destructive fire.

At the same time, the heavy infantry weapons go into position and intensify the destructive fire of the artillery.

3. Time immediately after the beginning of the attack:

After the crossing, the first wave attacks on a broad front behind the rolling barrage without regard to enemy centers of resistance. Its mission is to reach the first objective which should not be too far from the crossing site, but its location, however, will be dictated by terrain conditions.

The second wave takes over the mopping up of the terrain which has been won. Both attack waves move straight ahead.

The third wave, which has in it heavy infantry weapons and amphibious tanks, assumes the task of widening the attack and of securing its flanks. In this action, the amphibious tanks serve for repelling enemy tank attacks and for the liquidation of stubborn enemy centers of resistance.

The construction of the ferry is to be begun as soon as possible, depending on enemy action, for it is only by means of this that tanks can cross to the other side.

In order to get the main body of the

automatic weapons into action, the combat sectors of the lower units of the first wave should not be narrow. In addition, concentrations are to be avoided at crossing site.

Batteries or battalions of artillery are to be assigned to even the lowest units for co-operation, at least temporarily.

The follow-up forces pass on beyond the first and second waves in uninterrupted attack in order to permit early construction of the bridge, and to permit bringing up the main body of the armored forces.

The construction of the bridge will require from 4 to 8 hours depending on the width of the stream. It must be completed soon enough for the main body of tanks to be on the other side of the river by daybreak.

Only with the help of the armored forces is the widening or holding of the bridgehead possible. As a rule, therefore, the first and second days serve for widening or for holding of the bridgehead. This period will prove to be the decisive period of the battle.

War Experiences

The following is an account of an attack against an enemy prepared for defense. It involved a crossing of the Meuse at Sedan with the 1st German Armored Division in May 1940.

A more detailed description from the viewpoint of the command and the organization of the forces is contained in the book, *Meine Kriegserinnerungen*, ("My War Memories") by Colonel-General Guderian.

After thorough artillery preparation and a combined attack by all German Stuka *formations, the attack was launched during the afternoon hours.*

The crossing of the first waves was accomplished without difficulties and without major enemy opposition. Our losses in the approach to the river and in the assembly position were greater, as a result of enemy artillery and short drops by our own aviation, than during the crossing itself.

The first attack objective was reached practically without a rolling barrage or armored support. Because of the uninterrupted attack even during the night and an uninterrupted flow of heavy weapons and reserves, the bridgehead was rapidly widened, so that about 0400 hours the bridge construction for bringing the tanks across was finished and by daybreak a part of the tanks had crossed to the opposite bank.

As the result of the widening of the bridgehead which had been effected during the night, and the very strong antiaircraft artillery protection, the enemy was unable, either with his air or his ground means, to prevent the crossing of our forces during the following day.

The enemy counterattack was made against our flanks, yet not until 24 hours after our crossing. The operational breakthrough began in the night after the construction of the bridge.

The entire Meuse crossing was accomplished in accordance with a schedule established weeks before.

Surprise Crossing

The following is an account of the crossing of the Dnepr at Gornostaipol, north of Kiev, in the middle of August 1941, with the 11th Panzer Division.

After assembly in the Berdichev-Zhitomir area, about 95 miles from the intended crossing site, there followed the night breakthrough of weak enemy positions on the southeastern edge of the Pripet Marshes.

In an uninterrupted advance, avoiding highways and major enemy forces, the advance detachment, the 61st Motorcycle-Rifle Battalion and the 1st Armored Com-

pany, reached the Dnepr, at dawn, and in hand-to-hand fighting, seized the bridge intact.

Two rifle companies, also, had succeeded in reaching the other side of the river, when the bridge was destroyed in a surprise attack by Soviet fighter formations.

With the help of our own tanks which had arrived in the forenoon, the bridgehead was held against all enemy counterattacks, with the tanks on the west bank providing security for the flanks of the small bridgehead.

It was only with the arrival of the engineers, who were delayed, that the bridgehead was gradually reinforced with men and matériel by the use of pneumatic boats.

On the following night, light ferries were constructed and with the help of the engineer forces of the commanding infantry corps which had arrived, in the meantime, there was effected the transfer to the opposite side of tanks and armored reconnaissance cars.

On the third night, the construction of the bridge was completed, making it possible to extend the bridgehead to a depth of 6 to 10 miles. After the arrival of the Infantry Division, the bridgehead was turned over to it, and the Armored Division pulled out.

From the experiences of this operation, the fact becomes evident that the engineer forces also must be provided with all-terrain and armored vehicles.

Crossing a Frozen River

Istra is an artificial lake northwest of Moscow which was crossed by the 11th Panzer Division at the end of November 1941.

At a distance of about 12.5 miles from the crossing site, and during an incompleted combat operation, a task force, consisting of a reinforced Motorcycle Rifle Company and an Armored Company with attached heavy infantry weapons, was formed.

In a night attack, by-passing all enemy resistance, the crossing site was reached within 2 hours' time. Reconnaissance or the study of aerial photographs was impossible.

After a short period of preparation at the crossing site itself, the crossing began. The tanks deployed to left and right, and the motorcycle rifle forces, having dismounted from their machines and covered by the simultaneous fire of the tanks and the heavy infantry weapons which was directed against the weak enemy positions, effected a crossing.

While our fire held down the enemy to the right and left of the crossing zone, our attack force, with a narrow front, crossed the frozen surface of the river which was about 330 yards wide.

One platoon of the tanks, during the time of the crossing, provided security farther back in the enemy area against cavalry attacks—a rule one must always give attention to in crossings in the depths of the enemy's hinterland.

After the heavy weapons crossed, the bridgehead was extended in depth until the arrival of the other forces of the Panzer Division.

By the use of fascines which were frozen together, we succeeded in getting the Panther IVs *across the river.*

River Defense

Rivers represent no absolute obstacle. An adversary who possesses superiority of matériel—including aviation—nearly always succeeds in his first crossing. Nevertheless, the river obstacle will often succeed in preventing a decisive breakthrough.

On the other hand, however, the defender is seldom able to wipe out a bridgehead, once it has been established.

It is not wise to push the forward defense dispositions clear up to the near bank, for this has almost always led to the annihilation of the forces occupying them. And it has made no difference whether the bank was higher than that of the enemy's, or not.

Field Marshal Rommel's construction of beach obstacles in his command area, which, in the case of rivers, would correspond to the fringe-zone of the bank, should be a better solution of the problem and save unnecessary losses. In the case of the infantry, much value is to be attached to the engagement of a few flanking machine guns.

Battle Preparations

A thorough reconnaissance of the terrain by all commanders is to be carried out, especially at the beginning, when the enemy's weapons have not yet started to move into position.

During the course of major defense battles on rivers, it is to be expected that forces will be constantly moved here and there during the nighttime.

The backbone of the defense is the artillery in conjunction with strong armored reserves for counterattacks.

The establishment of a good artillery intelligence network is to be started early.

Likewise, a well organized observation post network together with alternative positions is to be established in order to avoid unobserved fire as much as possible.

The early engagement of all enemy preparations requires great quantities of ammunition. In addition, a large ammunition reserve is to be established for employment at the moment of the enemy crossing.

The mission of the infantry consists, mainly, in the conservation of its combat strength for the actual attack. It should protect itself against the enemy artillery fire and bomb carpets before the beginning of the attack.

For the reserves—armored forces—a number of attack plans for all possible cases are to be prepared and practiced. The evaluation of the enemy picture by every possible means, for the purpose of ascertaining the probable time of the attack, is an important task for the command. Daily aerial photographs and the use of observation battalions and combat patrols for the bringing in of prisoners, contribute greatly to the determination of the time of the attack. In spite of extensive coding, the radio interception service still possesses possibilities for the rounding out of the enemy picture.

On the other hand, careful camouflage of heavy weapons and artillery is of great importance.

Organization

The defense forces are to be engaged in a widely-spaced, deeply-organized manner. It is to be counted on that the enemy will establish a bridgehead of between 6 to 10 miles depth in the course of a large-scale attack.

The local reserves are to be held close to the important points in order that they may not, eventually, find themselves in front of the enemy's barrage.

The artillery is to be ready, at all time of day or night, to lay down a fire concentration at any point of the sector. Also, the wiping out of numerous observation posts by the enemy is to be expected, during the course of the attack, which, possibly, may have to be compensated for by unobserved fire.

The employment of alternative positions and the construction of dummy positions are of some help in preventing the elimination of one's own artillery.

As a rule, a part of the defender's artillery will be engaged in a continual change of position the night before the attack. If

not absolutely necessary, all fire is to be avoided before the attack, even by those portions of the division artillery engaged for counterbattery work.

The armored forces are to be prepared for action outside the range of the enemy's artillery and camouflaged against air attacks. All radio traffic is to be avoided during this time.

The main mission of the antiaircraft artillery should be the protection of artillery positions and armor assembly areas.

Artillery and Aviation

If the enemy succeeds, however, in effecting a crossing, and if the defender is not able to wipe out his bridgehead, it becomes, to an increased degree, the mission of the artillery and aviation to wear down the forces in the bridgehead. At the same time, every effort must be made to hinder the enemy's crossing activities, in which connection, powerful, high-angle fire is the most effective.

The floating of river mines and burning fuel oil against bridge sites may give temporary success, but does not possess decisive value.

If one does not succeed in the first counterattacks with armored forces in crushing the bridgehead, it is useless to make further use of the valuable armored means for this purpose. It is better then to deploy the armored forces in such a manner as to be able, by an attack from the deep flank, to break up or to contain the enemy breakthrough.

German Experiences

Defense on rivers will almost always develop into a large-scale battle with heavy engagement of matériel. Weak forces, unsupported by powerful artillery, will not be able to prevent crossings, even those of the *coup de main* type. The elimination of an enemy bridgehead is possible only on the condition of an immediate counterattack.

The following is an example of a defensive battle at the Oder River in February and March of 1945.

The enemy forces consisted of nine rifle divisions, including two labor divisions. In regard to artillery, aerial reconnaissance and observation battalions located approximately 1,000 guns in the area. There were two armored brigades. There was medium fighter-bomber activity over our front line. The enemy also had a powerful concentration of medium caliber antiaircraft guns. The morale of the men was fair and some of the infantry units were at reduced strength. The enemy intended to widen the Oder bridgeheads for a breakthrough.

Our forces consisted of one armored division containing one motorized infantry regiment (minus one armored personnel carrier battalion), three officer candidate school regiments, one weak *Feldherrnhalle* battalion and one Peoples' Assault Battalion. There was one battalion of 42 *Panther* tanks, and a *Hunter* battalion of 31 assault guns. As time went by, a *Royal Tiger* battalion of 41 tanks was added. In the matter of artillery, there was one armored artillery regiment. Attached or co-operating during the fighting were added: one Peoples' Artillery Corps, one French and one German mortar battery, two *K5s*, one heavy mortar battalion using 12-cm guns, one rocket-projector battalion using 15-cm rockets, one antiaircraft artillery regiment, and one observation battalion. In addition, there was one fully armored reconnaissance battalion, one engineer battalion, one antitank battalion, as well as all the normal division forces.

There was close co-operation with the *Richthofen* Air Corps and other special air force organizations.

There was a total strength of approximately 17,000 men, manning a sector which was originally about 20 miles wide but was later reduced to 10 miles. The morale of our forces was good, in fact, it

was suitable for attack missions although they were employed on defense.

Because of enemy artillery fire, the disposition of the infantry was very loose but was organized in depth. There were four regiments on the line.

Reserves were organized into an armored combat team consisting of the armored regiment, the armored personnel carrier battalion, and an armored reconnaissance battalion. In addition, the assault guns were distributed by platoons among the infantry regiments as local reserves.

The division artillery, together with the Peoples' Artillery Corps and the Antiaircraft Artillery Regiment, co-operated very closely with the infantry. In addition, the Antiaircraft Artillery Regiment was engaged as a "tank barrier" for an expected major enemy attack. However, due to its constant, normal use, it was kept at a distance of 4 to 7 miles behind the front line.

A very dense signal communications network, on which was superimposed the artillery network, covered the entire sector. Radio traffic was suppressed only for the armored combat team when there was no action.

In the course of time, our forces succeeded in constructing a good system of positions—except for those sectors with a high ground-water level.

Initially, the division combat post was very far forward, but later was drawn back out of the artillery range of the enemy division.

Soviet Operations

At first, the enemy made an effort to hold the bridgeheads established at the beginning of the battle against all counterattacks. This he succeeded in doing. Later, in his efforts to widen the bridgeheads, he went over to larger operations. Thus, there were almost uninterrupted attacks and attempts at crossing which were always concentrated on the bridgeheads. All attacks were supported by strong artillery and mortar fire, but never was there more than a part of the superior enemy artillery engaged.

Each rifle division had one regiment in the front line, one regiment in reserve, and one regiment behind the sector for rehabilitation.

Nearly all attack operations occurred shortly before dawn, in order to escape the fire of the German artillery. They were never conducted in company strength —usually in battalion or regimental strength. The artillery preparation lasted on an average of 15 to 20 minutes.

Because of the presence of the German tanks with long-barreled guns, the enemy tanks, as a rule, remained at distances of over 1,100 yards. After the arrival of the *Royal Tiger* tanks, however, they remained at distances of 1,650 to 2,200 yards and sometimes even farther away. For this reason, their participation in the fighting had no great effect. Fights between tanks were avoided as a rule.

Just one major tank battle, in which about 100 tanks participated, occurred about the middle of March. This battle was started after a very heavy, sudden concentration of fire by Soviet artillery, and the use of a smoke screen over a width of about 1 mile. The Soviet artillery fire crushed the foremost positions and with bounds of around 330 yards a dense barrage moved ahead of the tanks into the depths of our position.

However, by means of our automatically beginning barrage fire, we succeeded very quickly in separating the enemy tanks from their accompanying infantry and in preventing a widening of the bridgehead. But the Soviet tank attack came to a stop only after an advance of 2,200 yards, when it encountered the local assault-gun reserves and the "tank barrier" or the antiaircraft artillery. Two hours after the beginning of the attack, the *Panther* bat-

talion entered the fight. Unfortunately, the counterattack had to be conducted frontally, so that it failed, because of the "tank barrier" immediately created by the Soviets in the intermediate area. During the night, the main body of the enemy tanks was drawn back. During the following night, we succeeded, with the aid of tank demolition detachments, in destroying a part of the tanks which remained.

Soviet Artillery

The main portion of Soviet artillery consisted of batteries which had remained silent until the large-scale attack. In spite of this, however, the Soviet artillery had been numerically superior in all attack operations.

Uninterrupted destructive fire was laid down on the front lines and the inhabited localities in the main defense area. There occurred, however, no systematic engagement of our artillery.

The density of the Soviet mortar fire was astounding. It was responsible for the majority of our losses. In addition to this, the mortars could hardly be located.

The Soviet artillery was not able to measure up to the German artillery in speed and accuracy. Apparently, the Soviets had signal communication difficulties.

The work of the Soviet engineers was most remarkable. During the course of one night, they constructed an underwater bridge across the Oder, which was filled with floating ice. In spite of continual artillery fire, they were able to expand it to a 45-ton bridge.

On the other hand, all of our own attempts at hindering them, by the use of swimmers, floating mines, and of floating burning fuel oil, were useless.

The Soviet aviation was confined to daily operations over our front line. Aside from causing a certain degree of uneasiness in the case of the crews of the heavy weapons, they were unable to locate the high firing angle weapons or achieve any other tangible results.

Due to the powerful Soviet concentrations of antiaircraft artillery, which reminded one of Leningrad and Murmansk, our aviation attacks on the bridge sites were fruitless. Our aviation was not able to support ground operations because of the disposition of the forces.

The greater part of the Soviet radio traffic could not be decoded. There was an exception in the conversations between enemy tanks which was not coded. However, they gave nothing but indications of movements on the field of action which could be utilized only with a knowledge of the location of the tanks concerned.

However, a series of statements by prisoners soon provided us with a complete picture of the enemy. From the standpoint of morale, some were very downhearted at being taken prisoners before the capture of Berlin. In addition to this, as a result of their continual fighting and because of the strong German artillery fire which had caused excessive losses, the strength of their units was badly cut down. The prisoners from the two *Proletariat* divisions who, for the greater part consisted of convinced fellow-travelers, were an exception to this. Especially feared were the fire concentrations of the German artillery, which brought losses and lowered morale. For this reason, it was necessary for the Soviets to change the rifle regiments on the front line every 3 days.

German Operations

The armored division, as a result of the poor command of the corps in control, was sent piecemeal into the battle until an appeal from the division, through the Inspector General of the *Panzerwaffe*, put an end to this procedure.

As a result of the width of the sector, the fighting was conducted in a mobile manner until the shortage of infantry was ended by the attachment of three

officer-cadet school regiments. We did not, however, succeed in wiping out the bridgeheads again which had been established by the Soviets in combat against the Peoples' Assault Units. Despite powerful artillery preparations, the use of fighters and *Stukas*, as well as the armored combat team, and in spite of the fighting spirit of our forces which, in 1945, was still of a high order, we learned that our counterattacks were often of no avail. The reasons for this were the superior Soviet barrages, the tank barrier which the enemy immediately established, and the powerful Soviet infantry which could entrench in an exceedingly brief time. In addition, when the Soviet forces counterattacked, they attacked simultaneously at various locations to relieve pressure.

We no longer attempted to clean up these places where the enemy had broken into our position by means of attacks, for these counterattacks resulted in too many losses. We left the task of eliminating these enemy forces to our artillery. This expedient was contrary to the *Führer's* command, and in the course of time, friction of the most serious kind developed because of the "Fortification Order" of the *Führer's* Headquarters. On the other hand, all prisoners' statements confirmed the devastating effects of the German barrage and destructive fire laid down on the places where the enemy had penetrated our position.

The enemy's losses in men and matériel increased enormously, so that the enemy postponed major operations until the time of his April offensive.

The armored regiment, safe from enemy artillery and air attacks in the rear portion of the division area, stood ready as counterattack reserves for eventual major attacks. It was able, in this way, to perfect its already excellent condition and it succeeded during a period of 14 days in the hard battles of the Soviet great offensive in destroying 214 enemy tanks of the *T43* and *JS* type. Only a shortage of armor-piercing shells and motor fuel put an end to these unusual results.

The engagement of the armored infantry, and particularly the armored personnel carrier battalion, took place during the first weeks, when the front still offered possibilities for the successful employment of armored forces. With the front becoming static and the presence of numerous enemy antitank guns, the armored portions were pulled out and used as reserves. In spite of this, however, the motorized infantry very often had to be used temporarily and hurriedly, taking over some sector which had to be relieved.

The three officer candidate school regiments fought bravely, but with considerable losses. In spite of the exemplary braveness of the regiments, which consisted only of lieutenants and master sergeants, the enemy artillery often canceled otherwise successful counterattacks. At the same time, these young battalion and regimental commanders, although they gave all they had, did not display the knowledge which is necessary in a battle of matériel against a superior enemy.

On the average, the division received from 2,000 to 3,000 replacements each month during the defensive battle. Its losses were almost 150 men a day and at times even reached 350.

As has been mentioned, the co-operation between tanks, assault guns, and the armored infantry of the division was excellent.

The 7.5-cm tank gun of the *Panther* was superior to the 8.5-cm gun of the *T43*, and in addition to the purely technical superiority of the German gun and sighting instruments, there was also German superiority in regard to the marksmanship of the personnel. The Germans often scored hits on the second shot at distances of from 1,100 to 1,650 yards, while the Soviet tanks required from 5 to 8 shots before scoring a hit. In many cases, the Soviet

tanks never fired the third shot. Also, the muzzle velocity of the 8.5-cm gun was less, so that the projectiles often ricocheted off the *Panther* as well as the *Royal Tiger*.

Both *Panthers* and *Royal Tigers* were very mobile in combat. For all these reasons, the Soviets always drew their tanks back to distances of over 1,650 yards in order to avoid destruction. As a rule, it was the Soviet 7.62 antitank cannon that assumed the task of combating our *Panthers*, and this it accomplished with better success at distances under 880 yards.

The "show piece" of the division was the attached *Royal Tiger* Battalion which, because of its nearly ideal construction and the superiority of its 8.8-cm tank cannon, did not need to fear even the stronger *JS* tank.

Iron Fist

This fact confirms the German rule of the *Iron Fist*, that is, *a heavy, long cannon, on a strongly armored chassis*. For example, a *Tiger I* tank, which possessed but 5 armor-piercing, and 10 high-explosive antitank shells, together with a small group of infantry, held the enemy in check for several days in a breach of 880 yards he had made.

The armored combat team (armored regiment, armored infantry, and armored reconnaissance battalion) was, as a rule, commanded by the division commander personally. This solution was likely to be regarded as the most favorable in this case, since the division commander had already taken part in 265 tank attacks, and was regarded as one of the best tank commanders in the Army.

The artillery, which was very strong for a division, formed the backbone of the defense. Thus, even if not numerically as strong as the enemy, a weight of artillery which must have been unexpected by the enemy, could be thrown into the defense. There were 250 cannon available to the defense in the division sector. Its very flexible engagement and a very complete signal communication network were the keys to the artillery's success.

It was, thus, possible at all times, day or night, to combat enemy attacks, sometimes while they were still in their assembly area or, at the latest, while in the breach made by them in our position. It remained a puzzle, however, why the enemy did not combat our artillery and knock it out. Indeed, the Germans were always able to put parts of the enemy artillery out of action at least for a while. One had the impression that the Soviets were more interested in a surface effect than in the destruction of individual targets.

Altogether, our artillery was never at rest, day or night, especially since part of it was constantly engaged in changing positions. Our troops may often have cursed this condition a bit. Actually, however, losses were spared this decisive arm because of this.

The mortars, which were used in the combat of the bridge, had to be placed in the front line for technical reasons connected with their fire. Three nights were required for this work, every possible means of camouflage being employed. They succeeded nearly every day in their principal mission of destroying the Soviet underwater bridges, however, the excellent Soviet engineers succeeded each time in restoring and improving the bridges during the night.

The employment of the two *K5s* was of no appreciable help to us. To begin with, a large amount of complex auxiliary apparatus was required, and the results obtained did not justify their use. They were employed against enemy detraining points some 25 to 30 miles distant. Artillery planes were used first for fire control, but with increasing enemy air protection, observed fire had to be abandoned, and the battalion was later pulled out.

One of the most effective elements in

the defense was the 12-cm Mortar Battalion. Unfortunately, however, the situation with respect to the 12-cm mortar projectiles was so hopeless, that these mortars could seldom be employed. But whenever they were, their effects were devastating. A certain degree of compensation was had by the engagement of a rocket-launcher battalion, which had sufficient ammunition. The disadvantage in their case, however, was that their positions were easily spotted.

Antiaircraft Artillery Regiment

For the engagement of enemy tanks, an antiaircraft artillery regiment was assigned to and placed under the orders of the division. Although supplied with great quantities of ammunition from the stores of the "capital city air defense zone," it was never employed during the early days. The artillery commander of the division then managed to incorporate this regiment into his own artillery for use mainly in normal artillery missions. It was necessary, for technical reasons connected with its fire, to engage this regiment about 6 miles behind the front line. Even from this position, according to the reports of prisoners, the effects of its fire were devastating, especially in wooded areas, due both to its high rate of fire and the explosion of shells striking trees. Also, due to the high technical perfection of the fire-control apparatus of the antiaircraft artillery, its fire was not only very flexible but also very accurate.

Co-operation with the *Luftwaffe* was excellent. To begin with, an air force liaison command was stationed with the division. In addition, in each separate operation, whether of the infantry or the armored combat team, there were air force liaison officers with the engaged formations of the division. Every demand was fulfilled by the armored corps in command.

It is beyond our ability to know, however, how much the employment of the *Luftwaffe* contributed to our actual successes. At least, however, the moral effects of this support on our infantry were great. It failed, however, in its most important mission: the destruction of the enemy bridges. Neither *Stukas* nor fighters were able to achieve any successes here, due to the powerful concentrations of enemy antiaircraft artillery, especially as there were no bomber formations available.

With a supply column capacity of around 300 to 500 tons, supply was no problem, and especially since the distances were all very short.

The tactical group of the division headquarters was faced with a difficult task due, on the one hand, to the large number of units, and on the other, to interference from every possible source of command, not only from corps and army, but also Himmler, the *Reichsmarschall*, and the *Führer's* Headquarters. The *Reichsmarschall*, the Supreme Storm Trooper Detachment Command, General Krebs, the inspectors, and Bormann's staff, often interferred seriously with the division's command post.

The frictions arising from these visits, demands, and contested competencies, were ironed out only by the intervention and the help of the Inspector General of the Armored Forces.

Recapitulation

This fighting, which lasted over 2 months, has, except for the part played by the air forces, much similarity to the defensive fighting which occurred in Korea. Even though the fighting on the Oder was national in its character, nevertheless, a considerable number of nondivisional units took part in it under command of the division. Furthermore, on both sides the fighting was conducted with matériel. For the German units, outside of the immova-

ble defense commanded from the *Führer's* Headquarters, there was no operational objective.

On the part of the enemy, the intention was to widen these initial bridgeheads, then, after they were combined and widened, a large bridgehead should be created permitting the tactical assembly of at least an army. We were able to prevent the enemy from fulfilling this plan.

In itself, the use of an armored division for static defense, was contrary to all principles of armored tactics, but it is also questionable whether a Peoples' Rifle Division, without tanks, assault guns, and armored infantry, would have been capable of preventing the enemy from carrying out his intention of establishing an operational bridgehead.

But the fighting also proved, with a possible future application, that a well-equipped armored division, copiously provided with artillery and ammunition, is capable of stopping a number of Soviet divisions. And this happened at a time when, to many of the troops, the outcome of the war already appeared to be decided.

The matter has often been considered in the higher command echelons of changing the armored division from an armored to a purely infantry command. Such a change would likely have destroyed some of the confidence of the troops in the command and on the other hand, would have led to a senseless employment of the armored matériel. In this defensive battle, however, there was only one idea to be followed: conduct the battle with the artillery and prepare the armored reserves for counter-attack.

The most dramatic advance in our program to build the fire power of our units has been the development of atomic weapons for battlefield employment. Last May I witnessed from a forward trench the firing of the first atomic shell from our new 280-millimeter gun. This gun can hurl either atomic or conventional projectiles further and with greater accuracy than any other artillery piece in our arsenal. It was an awesome sight, signalizing an achievement which greatly multiplies the firepower of our forces.

. . . . This gun will greatly enhance our defensive capabilities, which is why we have shipped some of them to Europe. Ultimately, as Army guided missiles are perfected, they too will add in delivering fissionable materials or conventional explosives in close support of Army ground forces. The important thing is that we have the gun *now*, and can give our field commanders the capability of using atomic explosives safely and accurately in darkness or in any kind of weather, if it should become necessary to do so.

Secretary of the Army Robert T. Stevens

BOOKS OF INTEREST TO THE MILITARY READER

DISASTER THROUGH AIR POWER. By Marshal Andrews. 143 Pages. Rinehart and Co., Inc., New York. $2.00.

BY CAPT DAVID J. WELSH, *USN*

This book is a warning against the basing of American military policy and the concomitant survival of the United States and the free world on a single weapon—strategic air power armed with the atom bomb. The author believes that air power zealots have so bombarded the public, press, and magazine editors with the Air Force "party line," that the American people are making decisions, through their representatives in Congress, on vital military policies without adequate information to enable them to separate facts from propaganda, history from biased claims.

The author contends that the accomplishments of air power in World War II have been magnified out of all proportion to actuality and their basic lessons misinterpreted. He further states that the Air Force insistence on making the intercontinental bomber the backbone of its doctrine is an isolationist concept that, in the event of war, would nullify the Atlantic Pact, lose us our European allies, and result in our being bottled up in the Western Hemisphere, surrounded by enemies, and doomed to a protracted struggle of mutual devastation.

Mr. Andrews takes the Army to task for not countering Air Force propaganda by reminding the public that man, and not the machine, is the ultimate weapon in war—a fact repeated throughout history and in no way controverted by the complexity of modern warfare. Only by aggressive, intelligent indoctrination and education can the Army convince the American people of the enormous value of peacetime training of soldiers as a means of saving lives in war. He further condemns the Army for allowing the Air Force to relegate tactical aviation to a secondary role despite World War II's repeated demonstrations of the basic necessity of tactical air integration with ground maneuver in modern war.

The Navy is also taken to task for allowing itself to be drawn into an argument over strategic bombing when it should have been emphasizing the growing importance of its role in keeping safe the sea lanes as our economy becomes ever more dependent on imported raw materials, and the logistical requirements of our overseas forces and those of our allies demand uninterrupted control of the seas. The strategic and tactical implications of the vulnerability of Eurasia to amphibious assault along her extensive coastal frontiers should also be explained to the American people.

Disaster Through Air Power presents a cogent argument for re-evaluation of our military policy. Published in 1950, the basic elements of conflicting opinion as to the philosophy on which our military policy should be based has not changed. Only an informed American public can make the fateful decisions regarding our military structure which may decide our survival and that of the free world.

JOURNEY TO THE FAR PACIFIC. By Thomas E. Dewey. 335 Pages. Doubleday and Co., Inc., New York. $4.00.

IMPERIAL COMMUNISM. By Anthony T. Bouscaren. 256 Pages. Public Affairs Press, Washington, D. C. $3.75.

SOVIET MILITARY DOCTRINE. By Raymond L. Garthoff. 587 Pages. The Free Press, Glencoe, Ill. $7.50.

BY MAJ JOHN J. EARLEY, *Inf*

Soviet Military Doctrine is an analytical study of Soviet "principles of war." It inquires into the guiding doctrine of Soviet Armed Forces, the foundation of their strategy, and their employment in war.

Most of the material upon which the book is based has been unavailable before. The author has consulted hundreds of Soviet books, monographs, and documents, as well as relevant works in other languages. He has also profited from interviews with a number of former Soviet Army and Air Force officers now living in the West.

Soviet military doctrine differs from our own chiefly in the relative stress placed on certain commonly accepted principles of war. Some of the differences are due to Imperial Russian or German influences, and others to Marxist-Leninist ideology. Essentially, however, the author finds that the framework of Soviet military science is similar to American doctrine, and that it is *fundamentally sound.*

Soviet Military Doctrine is good military fare and is the most complete book on this subject which the reviewer has seen.

CIANO'S HIDDEN DIARY, 1937-1938. By Count Galeazzo Ciano (Translation by Andreas Mayor). 220 Pages. E. P. Dutton and Co., New York. $4.00.

REPORTERS FOR THE UNION. By Bernard A. Weisberger. 316 Pages. Little, Brown and Co., Boston, Mass. $4.50.

THE RIVER AND THE GAUNTLET. By S. L. A. Marshall. 385 Pages. William Morrow and Co., New York. $5.00.

BY LT RICHARD G. BASTAR, JR., *Armor*

This book is another detailed study of war and the fighting man by the author of *Men Against Fire, Armies on Wheels,* and *Island Victory.* In his unique style, General Marshall tells the story of the tragedy of the Eighth Army on the Chongchon River in Korea during November 1950.

The two main phases of this operation, the "river" and the "gauntlet" phase, are covered. The first part of the book tells of the intervention of the Chinese "Volunteers" and the fighting on the Chongchon River. The author describes and analyzes the actions which snow-balled into the defeat of this mighty fighting team. No detail is too small if it contributes to the whole. One man action and division action are examined alike to get the answers to the whys of this battle.

The "gauntlet" phase describes the consequent withdrawal of the Eighth Army into the giant trap—a gauntlet of more than 6 miles of tortuous road, held and organized by the enemy. Vividly told is this "hitchhike out of Hades" in which the 2d Division suffered, in 1 day, losses roughly comparable to those suffered at Valley Forge by the Continental Army.

Equally interesting to the military and nonmilitary reader, it is one of the most descriptive accounts of the Korean conflict and the first complete analysis of this particular battle.

THE NEW MAN IN SOVIET PSYCHOLOGY. By Raymond A. Bauer. 222 Pages. Harvard University Press, Cambridge, Mass. $4.00.

TOMORROW'S AIR AGE. A Report on the Foreseeable Future. By Holmes Alexander. 248 Pages. Rinehart and Co., Inc., New York. $3.00.

TRIUMPH AND TRAGEDY. By Winston S. Churchill. 775 Pages. Houghton Mifflin Co., Boston, Mass. $6.00.

BY COL GEORGE V. BRITTEN, *British Army*

This immense tome concludes Sir Winston's personal narrative of World War II. It is also the last (to date) of a very large number of books by an author whose first book, *The Story of the Malakand Field Force*, was published in 1898. Like all Sir Winston's writings, *Triumph and Tragedy* is in beautiful English, terse, concise, yet highly descriptive.

The book opens with the allied landings in Normandy on 6 June 1944, and ends in the middle of the Potsdam Conference on 26 July 1945, when Churchill ceased to be Prime Minister.

The reason for the title is not far to seek, for the book covers the complete allied victory over both Germany and Japan, and clearly traces the beginnings of the present estrangement with Russia—the great tragedy of our times. Churchill warned on numerous occasions against what was likely to happen—the engulfment and bolshevization of the whole of Eastern Europe and the Balkans.

On the question of handing over European territory to the Russians, Churchill wrote on 4 May 1945, that this "would mean the tide of Russian domination sweeping forward 120 miles on a front of 300 or 400 miles. This would be an event, which, if it occurred, would be one of the most melancholy in history." It did occur. The Western allies allowed their vast forces to melt away before the Russians had conceded anything that mattered. The Russians never demobilized and now the Western allies have had to rearm at great expense. Churchill hints that he was prepared to force the issue with Russia in 1945 or 1946, if this became necessary, providing the Western allies temporarily retained their vast forces in Western Europe.

Churchill's relations with the commanders in the field were excellent. When General Eisenhower visited France on 7 August 1944, Churchill wrote, "He had not yet taken over the actual command of the army in the field from Montgomery; but he supervised everything with a vigilant eye, and no one knew better than he how to stand close to a tremendous event without impairing the authority he had delegated to others."

The death of Roosevelt was a terrible blow to Churchill. "In war he (Roosevelt) had raised the strength, might and glory of the Great Republic to a height never attained by any nation in history. With her left hand she was leading the advance of the conquering Allied Armies into the heart of Germany, and with her right, on the other side of the globe, she was irresistibly and swiftly breaking up the power of Japan. And all the time ships, munitions, supplies, and food of every kind were aiding on a gigantic scale, her Allies, great and small. . . ."

This historic book deals in outline with general strategical problems arising in the last year of the war, and is primarily concerned with the great political issues which emerge in the closing stages of any major war. Perhaps the overriding lesson of the last year of the war in Europe is the failure of the Western allies (with the exception of Churchill) to anticipate in time the true intentions of Russia, and to take appropriate action before the West dissipated its armed strength.

Just as war is a continuation of diplomacy (when the latter has failed to achieve its ends), so those responsible for conducting the higher strategy of the war must ensure that diplomacy can resume under the best possible conditions when the fighting ends. This responsibility lies in the sphere of the statesmen rather than of the leaders of the Armed Forces.

NUCLEAR PHYSICS. By W. Heisenberg. 225 Pages. The Philosophical Library, Inc., New York. $4.75.

THE NEW WARFARE. By Brigadier C. N. Barclay. 65 Pages. William Clowes and Sons, Ltd., London. $1.42.

BY COL HAROLD F. HARDING, *USAR*

The author, who is editor of *The Army Quarterly*, believes that conventional declared warfare with large bodies of foot soldiers is a thing of the past.

This book lacks a discussion of the implications of the hydrogen bomb and, since it was written before Stalin's death, neglects the present struggle for power in the Soviet Union. Its value lies in clearly stating the methods used by the Soviets since 1945. It is succinct, clear, and even hopeful in outlook.

CURRENT SOVIET POLICIES. Edited by Leo Gruliow. 284 Pages. Frederick A. Praeger, Inc., New York. $6.00.

BY LT COL HOWARD S. LEVIE, *JAGC*

To the student of the present-day Soviet Union, this documentation of the Nineteenth Communist Party Congress, held in Moscow early in October 1952, should prove invaluable as a source of material.

Although the editor's original intention was obviously to produce a documentary record of the Nineteenth Communist Party Congress, he permitted himself to be swayed from this intention by the importance of the event, and added a few documents concerning the reorganization of the Soviet Government which occurred upon Stalin's death. As a result, the basic documents constitute a well-rounded whole, while the addition gives the feeling of a misplaced appendage. However, this does not detract from the value of the volume, but since history is ever on the march, the author or editor who attempts to make his book as up-to-date as tomorrow's newspaper is foredoomed to disappointment.

FORMOSA BEACHHEAD. By Geraldine Fitch. 267 Pages. Henry Regnery Co., Chicago, Ill. $3.50.

BY LT COL FRANCIS R. SULLIVAN, *CE*

Here is a book by a sincere lover of China and things Chinese. Mrs. Fitch's experience and life in the Far East before World War II have given her an intimate and realistic knowledge of China, its people, and its leader—Chiang Kai-shek. Many readers will appreciate the author's defense of the oft-disparaged Nationalist Chinese.

HITLER'S DEFEAT IN RUSSIA. By Lieutenant General W. Anders. 267 Pages. Henry Regnery Co., Chicago, Ill. $4.00.

BY LT COL MARSHALL H. ARMOR, JR., *Arty*

Hitler's blunders and allied aid to Russia—not the might of Soviet arms—were the main causes of German defeat in the East, General Anders concludes in a thoughtful analysis which he is well qualified to write.

More than half of the short volume is devoted to a carefully documented and highly readable account of the strategy, grand tactics, and events of the campaigns of 1941-43. The book ends with a brief appraisal of Russia's present strengths and weaknesses, in which the latter are viewed as predominant.

FIGHTING INDIAN WARRIORS. By E. A. Brininstool. 353 Pages. The Stackpole Co., Harrisburg, Pa. $5.00.

FOREIGN POLICY WITHOUT FEAR. By Vera Micheles Dean. 220 Pages. McGraw-Hill Book Co., Inc., New York. $3.75.

BEYOND CONTAINMENT. By William Henry Chamberlin. 406 Pages. Henry Regnery Co., Chicago, Ill. $5.00.

MARCH OR DIE. By H. Swiggett. 239 Pages. G. P. Putnam's Sons, New York. $3.75.

BRAIN-WASHING IN RED CHINA. By Edward Hunter. 341 Pages. Vanguard Press, New York. $3.75.

BY MAJ DANIEL J. KERN, *USAR*

Mr. Hunter has made an exhaustive examination into the pressure methods used by the Chinese Communists to mold the populace into docile, if not enthusiastic, acceptance of the new order imposed by Mao Tse-tung. It is evident that these techniques have had a sinister success in the results already achieved and noted among all classes in China. That the techniques can sometimes be resisted, in no way lessens the fiendishness of their application, or the diabolical cynicism that has devised them. But it does lead to the inescapable fact that communism can sustain itself only by force—for if indoctrination fails, and after that brainwashing, the final argument is always that of the execution squad and the mass purge.

The significant point of the entire exposé that Mr. Hunter has undertaken is the fact that every action taken by the Chinese Communists, in concert with their Muscovite masters, is a calculated one. Whether the action can be indoctrination, the eliciting of "confessions," self-exposure, guerrilla activities in Southeast Asia, intervention in Korea, hate campaigns, the revamping of entire educational systems, or the enlistment of the arts and sciences in support of the "peoples' revolution," that action is part and parcel of a vast and integrated psychological warfare plan for the domination of Asia and ultimately of the world.

Mr. Hunter has provided a book of special interest for our own propagandists, who by their very function have the obligation of familiarizing themselves with these techniques. He makes mandatory on everyone connected or concerned with the national defense the recognition of the concept that psychological warfare activities do not and cannot exist by themselves apart from major policy and basic strategy; and conversely, that every action taken, diplomatically and militarily, must be weighed in advance against its inevitable psychological effect within our borders and across the seas.

PSYCHIATRY AND MILITARY MANPOWER POLICY. By Eli Ginzberg, John L. Herna, and Sol W. Ginsburg. 66 Pages. Columbia University Press, New York. $2.00.

OUR NEIGHBOUR WORLDS. By V. A. Firsoff. 336 Pages. The Philosophical Library, Inc., New York. $6.00.

BY LT COL RICHARD L. BISGARD, *USAF*

This is an astronomer's approach to the popular trend to write a book on interplanetary travel. The plants that are known to exist in our own solar systems are, one by one, explained in a language that even a layman can understand. The author is convinced that space travel is possible, even feasible. His main objective is to give the reader an idea of what the voyager might expect on each of the planets, how best to get there, and the probabilities of encountering an intelligent race upon arrival.

This book is an excellent cross reference for space-minded thinkers, and to the students of astronomy there is enough technical data in the appendix to satisfy even the most curious.

INTERNATIONAL POLITICS. By Frederick L. Schuman. 552 Pages. McGraw-Hill Book Co., New York. $6.00.

STRANGE CRIMES AT SEA. By Louis B. Davidson and Eddie Doherty. 273 Pages. Thomas Y. Crowell Co., New York. $3.95.

THE WORLD BETWEEN THE WARS. Volume II. By Quincy Howe. 784 Pages. Simon and Schuster, New York. $7.50.